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# **Worldwide Report**

**NUCLEAR DEVELOPMENT AND PROLIFERATION**

**No. 38**

**FOREIGN BROADCAST INFORMATION SERVICE**

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WORLDWIDE REPORT  
NUCLEAR DEVELOPMENT AND PROLIFERATION  
No. 38

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REPORTAGE ON U.S. NUCLEAR FUEL TO INDIA

Parliament Discusses Issue

BK201105 Delhi Domestic Service in English 0830 GMT 20 Mar 80 BK

[Text] External affairs minister, Mr P.V. Narasimha Rao, assured the Lok Sabha today that the government is prepared to meet any contingency arising from the nonsupply of enriched uranium fuel to the Tarapore atomic power station by the United States. All the alternative measures available are known to the government. The time has not yet come to use them.

Mr Narasimha Rao was replying to a calling attention notice on the reported complication in the supply of nuclear fuel by the United States. The issue was raised by Mr M. Ram Gopal Reddy, Mr Arjun Sethi, both Congress-I, and Mr George Fernandes, Lok Dal. In response to a suggestion that the United States should be told that enough is enough, the external affairs minister said the time has not yet come to say this. He said there is also no need to bring any international pressure on the United States or take the issue to the International Court of Justice. India hopes that the United States will honor the terms of the agreement which came into force in 1963. It cannot be changed unilaterally by either party.

Arbitration May Be Sought

BK200731 Hong Kong AFP in English 0702 GMT 20 Mar 80 BK

[Text] New Delhi, 20 Mar (AFP)--India has told the United States that if Washington does not honour the agreement under which India is to get 40 tons of enriched uranium for its Tarapore nuclear plant, New Delhi may seek an arbitration, the independent national daily TIMES OF INDIA said today.

In an exclusive report TIMES said: "...India has taken the position that there is nothing to bar the U.S. Government, including its domestic laws, to approve the pending shipment of nearly 40 tons of enriched uranium to India".

TIMES said that the Indian stand was conveyed to the U.S. Ambassador Mr. Robert Goheen by the Indian Secretary of State Mr. Eric Gonsalves and called it "a definite Indian formulation on this vexed issue worked out in the light of the policy of the new government."

TIMES quoted reports from Washington and said that the State Department would seek fresh assurance from India following Prime Minister Mrs. Indira Gandhi's recent statement in the Indian Parliament. Mrs. Gandhi told the Parliament on March 13 that while India remained committed to peaceful use of nuclear energy she would not hesitate to carry out nuclear explosions or implosions "in the national interest".



TIMES said "while contingency preparations are on to overcome the crisis in case the United States persists in its obduracy, there are indications that India might seek, as an extreme case, arbitration for which there is provision in the bilateral agreement".

Quoting competent sources TIMES said "although India would like to ensure supply of enriched uranium from the United States, if the supply is stopped India would be free to take an appropriate decision to make alternative arrangements for the fuel....One option is to buy uranium from other sources and the other is to develop a substitute".

TIMES said that the next step on this "contentious issue" would not largely be determined by the U.S. response to the Indian stand.

The Indian order for the supply of enriched uranium was placed with the U.S. Government well in advance of the March 10 deadline which under the 1978 U.S. Nuclear-Proliferation Act, bars further nuclear assistance to countries which neither sign the nuclear nonproliferation treaty nor permit international inspection of all their nuclear facilities.

#### MP Challenges Goheen's Statement

BK191556 Delhi Domestic Service in English 1530 GMT 19 Mar 80 BK

[Text] In the Rajya Sabha today, Congress-U member Mr N.P. Nanda demanded that the government should ask U.S. Ambassador in India Mr Robert Goheen to explain his reported statement in Calcutta on the nuclear fuel supply by the United States to the Tarapore atomic power plant.

Raising the issue as a special mention, Mr Nanda said Mr Goheen had stated that the supply of fuel by his country was finalized, but his country had to consider its delivery in view of the recent statement of Prime Minister Mrs Gandhi in Parliament on India's nuclear policy.

#### No U.S. Message

BK151302 Delhi Domestic Service in English 1230 GMT 15 Mar 79 BK

[Text] A spokesman of the External Affairs Ministry said in New Delhi today that India has not received any specific message from the United States asking assurances that this country will not produce nuclear explosives before Washington decides on shipping nuclear fuel for the Tarapore reactor. The spokesman was commenting on reported observations by the spokesman of the U.S. State Department on the prime minister's statement in Parliament on Thursday [31 March] regarding nuclear explosions.

It was pointed out by the spokesman of the External Affairs Ministry that Mrs Gandhi has clearly stated India's commitment to utilize atomic energy for peaceful purposes. Whether India will have explosions or implosions for the country's development and other peaceful purposes will be decided in view the national interest.

Additional Comments on Assurances

BK151601 Delhi ISI Diplomatic Information Service in English 1529 GMT 15 Mar 80 BK

[Text] In REUTER dispatch received by us on March 14. The United States has asked India for assurances that India will not produce nuclear explosives before Washington decided on shipping U.S. nuclear fuel for use in the Tarapore reactor. Tom Reston, State Department spokesman, is reported to have said that the United States has urged India to continue to adhere to its stated policy of nuclear research and development strictly for non explosive purposes. He added that the United States will take these factors into account in taking a decision on the pending licences for shipment of nuclear fuel to Tarapore. Reston has made these comments on the Indian prime minister's statement in Parliament on March 13 on nuclear policy.

Replying to queries on Reston's statement, the official spokesman has stated the following on 15 March. Discussions for the supply of fuel for the Tarapore reactor have been going on with the United States for several months. India's policy regarding nuclear energy has been clearly stated by the prime minister on March 13 in Parliament in which she said "the Government of India remains committed to its policy of utilizing atomic energy for peaceful purposes." He clarified that "the utilization of the nuclear energy for peaceful purposes covers nuclear experiments which may include explosions or implosions." Our prime minister in her statement in Parliament mentioned above has said "we remain committed to the use of atomic energy for peaceful purposes."

"We have to have explosions or implosions, whatever is necessary for our development and other peaceful purposes. This will be done in the national interest." He added that the "Government of India has not received any specific messages from the United States of the type indicated by Reston in the last few days. If there is any suggestion or communication of this type, it will be given appropriate consideration by the government. However, as far as the question of supply of nuclear fuel to Tarapore reactor is concerned, it is governed by bilateral agreements and contractual obligations between the two countries and we (India) hope that the United States will continue to stand by its contractual obligations.

CSO: 5100

WORLDWIDE AFFAIRS

U.S. NAVY OFFICIALS VISIT PAKISTAN; HAQ VIEWS OWN ROLE, NUCLEAR POLICY

BK201226 Hong Kong Radio in English 1213 GMT 20 Mar 80 BK

[Text] Karachi, 20 Mar (AFP)--President General Ziaul Haq of Pakistan disclosed yesterday that the commander of the U.S. Seventh Fleet and other high ranking U.S. Navy officials were in Pakistan for consultations with the government, NAWA-I WAQT, an independent [Urdu] language daily, reported today.

In an interview with the paper the president said that this team has not yet called on him but talks have been arranged.

President Zia told the interviewer that the process of bringing about important changes in the country would be completed by the end of the month. New corps commanders would take up their charge soon. However, no definite date can be set for the completion of this task, he stated.

The president said he had extended his term as the chief of army staff through the powers vested in him as president of Pakistan, since there was no other option in the context of the current administrative setup in the country. "If I were to form a political party or join an existing one, then I need not remain the chief of army staff any more and would have to quit the post," President Zia said.

Asked whether any changes had been made in atomic energy policy in the light of changes in the region and the American reaction to it, President Zia said during the review of the changes in the region, Pakistan's atomic energy for peaceful purposes programme never came up for discussions. Pakistan had already made it clear that its nuclear energy programme is for peaceful purposes, he added.

CSO: 5100

JAPANESE-U.S. NUCLEAR PLANT AGREEMENT

OW161115 Tokyo KYODO in English 1054 GMT 16 Mar 80 OW

[Text] Tokyo March 16 KYODO--Rough agreement has been reached between Japan and the United States enabling Japan to start construction of a plutonium conversion facility possibly this summer for the government-promoted nuclear fuel recycling plant at Tokai-Mura, Ibaraki Prefecture, government sources revealed Sunday. The project has been suspended since the 1977 Japan-American joint statement on the development of nuclear fuel recycling technology in Japan underlining American concern about nuclear proliferation.

The government is seeing its long-cherished hope materializing after repeated appeals to American nuclear nonproliferation officials for the lifting of the American-imposed freezing of the Japanese recycling project, the sources said. They also said an additional agreement was reached to extend ad hoc by one year the term of operation stipulated in the binational statement for the Tokai-Mura recycling plant, which was to expire late next month.

Japanese officials in charge of atomic power development are happy over the brighter outlook for the recycling project which will fuel the high-speed test breeder-reactor "Joyo," now in operation, a new-type archetypical converter-reactor "Fugen" and the planned archetype breeder-reactor "Monju," the sources said.

CSO: 5100



## ITALIAN NUCLEAR SALE TO IRAQ SAID TO COMPLY WITH AGREEMENTS

AU190845 Rome ANSA in English 0810 GMT 19 Mar 80 AU

[Text] Rome, March 19 (ANSA)--Italy's recent sale of nuclear technology to Iraq "strictly complied with the nonproliferation treaty and the London agreements", according to the head of the SNIA TECHINT nuclear laboratory suppliers. The company's director-general, Marino Fiorelli, issued a statement to the ANSA news agency last night in response to the news that the United States State Department has expressed formal apprehensions over the sale. According to an article in yesterday's New York TIMES, the Washington administration feared that the nuclear equipment sold to Iraq by Italy and not-better-defined "other countries" could be used to extract enough plutonium to produce a nuclear bomb in one year's time. Unidentified State Department sources were quoted in the article as saying that the so-called "hot cell" lab sold by Italy was "not necessary" for Iraq's current level of peaceful nuclear programming.

Refuting the assessment, Fiorelli told ANSA last night that the four laboratories Italy sold to Iraq with a February 1978 contract "could in no event be converted for military use". The four devices were described as a radio-chemical laboratory, delivered in April 1978, a laboratory for producing radioactive isotopes for use in medicine and industry, a chemical engineering laboratory and material-testing laboratory. The latter three are due for delivery at the end of this year. "No nuclear bomb has ever emerged from (a radio-chemistry laboratory) of this type", Fiorelli stated, "designed for university-level probes into the properties and reactions of radioactive substances". Fiorelli went on to say that the knowledge that may be obtained from the laboratory "did not represent a transfer of technology in the sense of the London agreement", since all of the notions that it may produce have already appeared in scientific literature and in international congresses and conventions.

The testing laboratory will be supplied by the state-held ANN company for the price of some \$52 million. The SNIA TECHINT director-general also noted that Italy's national nuclear energy commission as well as the Italian industries were involved in the deal. He also specified that France was the only other country that sold nuclear technology to Iraq and was supplying the Middle Eastern state with a 30-megawatt nuclear research reactor that runs on enriched 235 uranium at 93 percent. Italian sources indicated here last night that ONEN [National Board for Nuclear Energy] has supplied the United States with extensive assurances about the impossibility of using the laboratories for military purposes. They also said that the Italian-Iraq contract contained the clauses of the London agreement barring nuclear technology exporters from (selling) materials that may go to belligerent use. The same specialized sources also pointed out that Iraq has underwritten and ratified the nuclear nonproliferation treaty and is subject to inspection by the Vienna-based international nuclear energy agency.

FRANCE TO SHIP ENRICHED URANIUM TO IRAQ

Paris LE MONDE in French 5 Mar 80 p 3

[Article: "France Will Deliver Very Enriched Uranium to Iraq"]

[Text] France will deliver more than 90 percent enriched uranium to Iraq, probably at the end of this year or at the beginning of next year. Such enriched uranium can be used directly in explosives. It is intended to fuel a research reactor named Osirak, which was ordered by Iraq in 1976 from a subsidiary of the Atomic Energy Commission (AEC).

The 70-megawatt reactor is the same type as the Osiris reactor, which is located at the Saclay site and recently modified to run on low-enriched uranium (3-8 percent) in a fuel named Caramel, especially developed by AEC teams to limit the risks of nuclear proliferation (LE MONDE 27 June 1979).

The delivery of the reactor to Iraq was delayed a few months because of sabotage to the reactor's metal shielding, which took place in La Seyne, Var, in April 1979. According to some sources, the French government could have taken advantage of this delay to have Iraq accept Caramel fuel instead of the original. Actually, it has been confirmed in Paris that the highly enriched fuel will be used in starting up the reactor, which will be supervised by the International Atomic Energy Agency for civilian use. Talks may be held, as seems to be the desire of the French government, on the reactor's being refueled with Caramel.

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INDONESIAN-ITALIAN NUCLEAR ENERGY COOPERATION ACCORD

BK181300 Jakarta ANTARA in English 0759 GMT 18 Mar 80 BK

[Excerpt] Jakarta, 18 March (ANTARA)--Indonesia and Italy signed here Monday [17 March] an agreement on cooperation for the peaceful uses of nuclear energy after a series of talks between officials from both governments. The agreement was signed by State Minister for Research and Technology Prof B. J. Habibie and Italian Minister for Scientific Research and Technology Dr Vito Scalia, on behalf of their respective governments. This agreement is based on the existing technical and scientific cooperation agreement of 1972 and aimed at expanding the joint activities undertaken in this field since 1977.

Meanwhile, the National Atomic Energy Agency (BATAN) and Italy's Committee for Nuclear Energy (CNEN) will shortly agree on a cooperation scheme on nuclear fuel, radioisotopes, advanced technologies and nuclear safety.

In a joint communique issued following the signing of the agreement, Indonesia expressed appreciation for the technical assistance given by Italy through NIRA (Finmeccanica group) and ENEL (National Electricity Board) to a joint study with BATAN and PLN State Electricity Company for the first nuclear power station in Indonesia.

Both sides agreed that Italian participation in the setting up of the planned nuclear research centre in Serpong, for which detailed proposals have been submitted to BATAN by NIRA, would be given consideration in the spirit of the agreement.

The two parties discussed a scheme for cooperation in accordance with the planned national institute for energy. A joint working group will define a research program over the various sources of energy other than nuclear, and will carry it out through an exchange of scientific and technical information, training at research projects, organized meetings and planned workshops, as well as elaboration of scientific and technological programs of the institute and estimation of scientific facilities/instrumentation of various laboratories.

Schemes of cooperation in geothermal energy development between both countries will be worked out. Both parties therefore agreed to hold meetings in order to define industrial proposals on this matter. Indonesia and Italy also agreed on the possibility of a joint cooperative approach to the problem of transportation to meet the needs of Indonesia.

PETROV COMMENTS ON ISRAELI-SOUTH AFRICA NUCLEAR COOPERATION

LD202006 Moscow in English to Africa 1700 GMT 20 Mar 80 LD

[Vladimir Petrov commentary from the "Africa as We See It" program]

[Text] According to Western news agencies the Israeli Defense Minister General Weizman last week visited Pretoria with a secret mission.

Despite the secrecy lid the ubiquitous newsmen have learned the aim of the secret mission. They link it up with reports of a month ago about cooperation between South Africa and Israel in the production of nuclear weapons. The American TV company CBS believes that the nuclear explosion registered in the southern Atlantic last September was a result of this cooperation. The West German magazine DER STERN said that last week that, although South Africa and Israel deny it, last September Israel exploded a neutron bomb. [as heard] Evidently the Israeli minister's mission was shrouded in secrecy to conceal the aims of cooperation between the two countries. They are suppression of the national liberation movement in Southern Africa and in the Middle East.

It is not accidental that the Israeli emissary visited Pretoria soon after the victory of the Zimbabwe patriotic forces at the Rhodesian general election. Their victory has given rise to anxiety in South Africa. The racists regard it as a threat to their regime. To preserve the racist system they are prepared to commit any crime up to using weapons of mass destruction.

It would not be absurd to suppose that the Israeli minister's mission also pursued the aim of conveying to Pretoria assurances of American support for the racist plans. Direct contacts between Washington and Tel Aviv appear to be working without a hitch. (?But) for the time being the American administration does not risk establishing similar contacts with Pretoria. In any case it does not risk doing so as long as it continues to pose as the human rights champion.

CSO: 5100



## BRITISH CRITICIZED FOR IMPORTING NAMIBIAN URANIUM

### Television Expose

Windhoek THE WINDHOEK ADVERTISER in English 12 Mar 80 p 3

[Text]

LONDON: Britain was accused in a television expose programme here Monday night of defying international law and United Nations orders in importing uranium from the Rössing mine in SWA.

The world in action programme on ITV described how the British Government had allegedly turned a blind eye to the activities of the British-based Rio Tinto Zinc Company in trading with the "illegal South African administration" in SWA.

The commentator, Mr Ian McBride, said thousands of tonnes of uranium worth millions of rands were being shipped to Britain in an operation which was secret and which blatantly broke the rulings of the UN and the International Court of Justice.

The uranium was mined at Rössing in a deal that involved RTZ and the South African Government, he said.

The programme showed South African Airways and French UTA flights off-loading the uranium shipments in Paris and being taken by a haulage firm to Calais and then across the English Channel.

McBride said the "secret" shipments involved the UTA flights not being shown on airline schedules.

Shipments were also being

made by sea through Belgium, he said.

The Rössing deal was negotiated in the 1960's but by the 1970's - shortly before the contract was due to be signed - both the UN and International Court of Justice ruled that governments should avoid trading with SWA because it was "an illegally occupied territory."

Former Labor Government Minister, Mr Tony Benn, was attacked by RTZ chief executive, Mr Alistair Frame, in the programme.

Mr Frame said it was "a complete myth" for Mr Benn to say that the previous Labour administration was hoodwinked by RTZ during the Rössing negotiations.

He said the Labour Government was informed that the contract was about to be signed.

But Mr Benn said he knew nothing about the contract and added that he thought the uranium would come instead from Canada.

Mr Benn said it was only later that he discovered the truth and he had to admit he should have insisted the contract be cancelled.

"I was wrong," he said. "I think I was wrongly influenced by the fact that when you are signed and sealed you accept it." - Sapa

British Government: Nothing Illegal

Windhoek THE WINDHOEK ADVERTISER in English 13 Mar 80 p 4

[Article by Gail Visagie and SAPA]

[Text]

The British Government did not recognise the UN Council as SWA's administering authority, according to a spokesman for the British Foreign Office.

He was replying to a demand from Swapo for the immediate cancellation of Britain's contracts for uranium from the Territory.

There was nothing illegal about the trade, the spokesman said. The trade was not clandestine and the uranium was for civil energy purposes only. The companies concerned took account of commercial considerations in deciding how much to say publicly about the details of the supplies.

The spokesman told reporters that a decree of the UN Council for Namibia purported to ban foreign exploitation of the Territory's natural resources. But he added that the decree had no international legal force.

The general assembly, he continued, which in 1967 set up the Council for Namibia, was not empowered by the

UN Charter to impose binding obligations of this sort on member states.

He added that Britain was working closely with the UN to secure SA agreement to UN-supervised independent elections in SWA.

Britain considered SA's occupation of the Territory unlawful and wanted SA to withdraw. But Britain had never accepted the General Assembly's exclusive recognition of Swapo.

Swapo said in a Press statement that the practical implications of Britain's contracts for the uranium belied Britain's professed stand as an impartial party in negotiations for an independent settlement in the Territory.

The statement concluded "Swapo repeats its demand for the immediate cancellation of Britain's contracts for Namibian uranium and stresses its belief that this would increase pressure for SA's withdrawal from our country in compliance with UN resolutions".

The Swapo statement followed a British television programme on SWA uranium exports this week. <

CSO: 5100

**PRG, ARGENTINE OFFICIALS MEET ON ATUCHA 2 ISSUE**

**Officials Meet**

**PY201833 Buenos Aires NOTICIAS ARGENTINAS in Spanish 1512 GMT 19 Mar 80 PY**

[Excerpt] Buenos Aires, 19 Mar (NA)--PRG Foreign Affairs Minister Gunther Van Well [as received] said today that the Atucha 2 nuclear plant program is very "important." He added that if it is carried out "it will play a highly important role in the bilateral relations of our two countries." Van Well made this statement upon his departure from Government House, where he held a meeting with Argentine President Jorge Videla.

This was the first of a series of meetings that Van Well is supposed to hold with Argentine officials with whom he must discuss why the PRG Government has refused to grant the necessary endorsement for an PRG enterprise to export a nuclear reactor for Atucha 2.

Van Well is scheduled to have a meeting next Friday with Vice Adm Carlos Castro Madero, chairman of the National Atomic Energy Commission, who is responsible for the implementation of the nuclear policy ordered by the Argentine Government. There is also the possibility that either today or tomorrow he will hold a meeting with Argentine Foreign Minister Carlos Pastor. He said that this would be a "protocol visit" but that they would discuss the Argentine position of not accepting any other safeguards for the use of the reactor other than those established by the International Atomic Energy Agency or those safeguards regarding the use of nuclear power for peaceful purposes.

Van Well today visited government house with PRG Ambassador Joaquim Jaenicke [as received] and Argentine Ambassador Roberto Guyer.

**Reactor Discussed**

**PY201859 Buenos Aires NOTICIAS ARGENTINAS in Spanish 0002 GMT 20 Mar 80 PY**

[Text] Posadas, Misiones, 19 Mar (NA)--Argentine Foreign Minister Carlos Pastor told the press here today that he hopes the PRG will review its refusal to approve the shipment to Argentina of a reactor for the Atucha 2 nuclear plant.

Pastor, who today visited the Argentine-Paraguayan Yacyreta dam in the provinces of Corrientes and Misiones, held a brief press conference before leaving for the federal capital. First, he expressed satisfaction over the "most favorable credits obtained for Yacyreta," which he attributed to "the respect won by Argentina throughout the world because of the peace and order prevailing here."

Asked about the negotiation with the FRG aimed at obtaining the government's approval to export a nuclear reactor, the foreign minister voiced his belief that the negotiations "would yield the expected results."

He emphasized: "Germany promised to sell nuclear reactors to Argentina in order to allow us to complete our facilities, and we have maintained our offer and terms. Now we hope that they will be responsible enough to review their attitude."

He concluded by saying that he will accompany President Jorge Videla during his trip to the PRC scheduled for June and that he had planned to visit South Africa and the Arab countries during this year.

He said "I will also head the Argentine delegation which will travel to Yugoslavia if Tito's illness leads to his death."

CSO: 5100



CONGRESS EXAMINING BRAZIL-FRG NUCLEAR ACCORD

PY182330 Rio de Janeiro O GLOBO in Portuguese 16 Mar 80 p 36 PY

[Text] Brasilia (O GLOBO)--Expenditures for the import of nuclear technology up to June 1979 amounted to \$101.4 million, of which the Brazilian Nuclear Corporation [NUCLEBRAS] group contributed \$50.6 million; FURNAS \$39.5 million; and private national enterprises \$11.2 million.

Carlos Geraldo Langoni, president of the Central Bank, sent this data to the Congressional Investigating Committee (CPI), which is examining the Brazilian-FRG nuclear agreement. In an official note sent to CPI President Itamar Franco, Langoni makes it clear that it was not possible to identify the national and foreign enterprises involved in the nuclear agreement that had obtained funds for contracting the transfer of technology together with the National Patent Institute (INPI), which did not supply the Central Bank with this information.

But one of the reports sent to the CPI by the Central Bank reveals that the construction firm of Norberto Odebrecht, responsible for the civil engineering work of the Angra I and II nuclear plants, spent \$7.9 million on the import of technology up to June 1979. The overall remittances in payment for technology made to the FRG up to June 1979, according to the Central Bank, amounted to \$737.8 million.

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## WORLDWIDE AFFAIRS

### BRIEFS

FRENCH EXPERT IN ARGENTINA--Buenos Aires. 16 Mar (NA)--Gen Alberto Buchalet, father of the French A-bomb, is in Argentina on a private visit. Buchalet, former director of the French Atomic Commission, is currently the director of the French Chamber of Commerce for Latin America, which is made up of French exporters. During his stay in Argentina, he will meet with Economy Minister Jose Martinez de Hoz. [Buenos Aires NOTICIAS ARGENTINAS in Spanish 0112 GMT 16 Mar 80 PY]

CSO: 5100

## 'TIMES OF INDIA' VIEWS GANDHI'S NUCLEAR POLICY

BK180631 Bombay THE TIMES OF INDIA in English 15 Mar 80 p 8 BK

[Editorial: "Clarity at Last"]

[Text] Mrs. Gandhi's statement on nuclear policy in the Rajya Sabha removes unnecessary confusion and outlines the government's stand with refreshing clarity. While she has reaffirmed the policy of using nuclear energy only for peaceful purposes, she has said that, far from being given up, peaceful nuclear explosions would be carried out "in national interest". This should end the doubts which former prime minister Mr. Morarji Desai's contradictory statements had created. [paragraph Continues]

In a speech to the UN General Assembly's special session on disarmament, Mr. Desai had forsworn even peaceful nuclear explosions and had gone to the extent of questioning both the necessity and the wisdom of the Pokharan test in 1974. In reply, Mrs. Gandhi set the record straight. She pointed out that though Mr. Desai had indeed made the sweeping commitment--incidentally, without taking the Department of Atomic Energy into confidence--he had later changed his position somewhat. He had told parliament, for instance, that peaceful nuclear explosions, if found necessary, would be carried out in consultations with others though he never clarified who these others were. What she left unsaid was that at one stage Mr. Desai had tried to draw a distinction between a nuclear explosion and a nuclear blast.

One of India's neighbours, China is already a full-fledged nuclear-weapons power and will soon be acquiring a second strike capability and another, Pakistan, is embarked on a nuclear programme which has led its friends to conclude that it is determined to make the bomb. This inevitably raises security problems for this country. Rather than duck the ticklish issue, Mrs. Gandhi dealt with it frankly. While she has pointed out that it is far from certain that India's security would be enhanced by joining the nuclear race with these neighbours, she has agreed that "an in-depth study" of the consequences of nuclear developments in the neighbourhood must be made constantly and that this country should keep abreast of nuclear technology at all times so that "we are not caught napping." This is a rational and reasonable policy framework. But what about its implementation? That would call for a great effort of planning investment and political will. To begin with, the morale of the atomic energy establishment, shattered during the Janata rule, has to be restored. Then it has to be given a time-table and the necessary resources. Moreover, some hard decisions will have to be taken soon in order to keep Tarapore going if the United States decides not to live up to its contractual obligation to supply enriched uranium.

OXIDE FUEL TO REPLACE URANIUM AT TARAPUR

Lahore THE PAKISTAN TIMES in English 17 Mar 80 p 10

[Text] New Delhi, March 16: India's Tarapur power plant near Bombay is moving towards the stage of using mixed oxide fuels as an alternative to uranium.

"This process involves recycling of plutonium contained in the spent fuel.

"For some years it has become necessary to limit the output of the reactors to stretch out the fuel cycle in view of the uncertainty of enriched uranium supplies from the U.S. This has reduced the capacity factor to about 55-0/0" according Dr M.R. Srinivasan, Director of Power Projects Engineering Division of the Department of Atomic Energy.

Writing in the latest issue of 'Nuclear India' published by the Department of Atomic Energy, Dr Srinivasan says in these years of operations, there have been challenging tasks that have been solved successfully by the operation and maintenance team.

Dr Srinivasan points out that reactors using enriched uranium need to be refuelled once a year. The time taken for refuelling has been reduced from about 150 days initially to 68 days. Many tools have been developed to carry out various types of repairs and replacements through remote operations.

Since 1976 the refuelling programme is being executed at the Bhabha Atomic Research Centre (BARC).

This can also lead to the use of mixed oxide fuels, in which case the plutonium contained in the spent fuel could be recycled if this becomes necessary to keep the reactors going, Dr Srinivasan says.

Recalling the agreement reached with Canada for providing the designs and equipment for a heavy water reactor for the second nuclear power station, Dr Srinivasan said these reactors use natural uranium as fuel. They do not

involve the vexatious question of import of nuclear fuel. For this reason the heavy water reactors have been chosen as the main line of India's present nuclear power programme, he explained.

Dr Srinivasan says after gaining experience in the field, India should now strive to reduce the time for completing the reactor unit from 10 to seven or eight years.--PPI.

CSO: 5100



INDIA

BRIEFS

MORE HEAVY WATER PLANTS--India will set up three more heavy water plants, in the near future, reports AIR. The Chairman of the Indian Atomic Energy Commission, Dr H.N. Sethna said in Baroda on Thursday that these plants need not necessarily be coupled with fertiliser projects, but may be based on the water exchange process. Dr Sethna also said that work on the establishment of Atomic power station in Western region would be taken up soon. [Text] [Lahore THE PAKISTAN TIMES in English 14 Mar p 1]

CSO: 4220

## UNIVERSITY INSTALLS NEUTRON GENERATOR

Kuala Lumpur BUSINESS TIMES in English 5 Jan 80 p 3

[Text]

UNIVERSITY Sains Malaysia's first neutron generator will be operational before the end of the month, according to the latest issue of the university's *Berita Kampus*.

Dr Chong Chong Sing, head of UKM's biophysics group, says the generator would initially be used for neutron activation analysis.

He hopes other fields such as nuclear medicine for cancer treatment could also be explored by next year.

He says data from the analysis would be used in

the agriculture, the mining industry and in environment control.

Dr Chong adds that installation work on the \$150,000 generator is in progress and is expected to be completed before the end of the month.

Precautions to prevent any neutron leakage had also been taken.

This included a three-foot thick wall constructed around the section of the basement where the generator is to be installed.

The precautions are necessary to avoid dam-

age to equipment and biological tissues.

Dr Chong says that an International Atomic Energy Agency (IAEA) expert from India, Prof. A.M. Ghose, presently on a three-year contract with UKM, would be helping the biophysics group to draw up a neutron physics programme for the school of biophysics.

University Malaya and Universiti Kebangsaan Malaysia also have neutron generators.

— Bernama

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## DU PONT TO BUILD EXPLOSIVES PLANT NEAR MATAMATA

Christchurch THE PRESS in English 2 Feb 80 p 16

[Text]

PA Auckland

Du Pont (New Zealand) Ltd is to establish an explosives manufacturing plant on a 180 ha block 18 km from Matamata. The land is in the Kaimai Range area, and is described as rough grazing country, unsuitable for horticultural use.

Du Pont will set up a small scale manufacturing unit to produce water gel explosives, which have been imported since 1970. They are used primarily in the mining and construction industries, for tunnelling, quarrying and road building.

Only a fraction of the site, between one and two per

cent, will be occupied by buildings; the remainder will be a safety zone, and will continue to be used for grazing.

The plant will be prefabricated to a proprietary design. There will be several small buildings, including two warehouses for raw materials and an area for storage of the finished product.

Strict safety precautions will be taken in manufacture, transportation, and storage. Buildings containing raw materials will be separated, and the manufacturing and storage areas will be individually fenced.

No detonators or percussion caps will be manufactured on the site.

The manager of the plant, Mr A. E. Dunklee, said that the plant will use a "closed" manufacturing system which recycles all waste products. There will be no solid or liquid waste.

The construction of the plant, which will require capital expenditure of more than \$1M, would begin in April after local authority approvals, Mr Dunklee said, and would take between five and eight months to complete. Production could begin before the end of the year.

CSO: 5100

**GOVERNMENT PLANS REVAMP OF ATOMIC ENERGY ADMINISTRATION**

SK150524 Seoul THE KOREA TIMES in English 15 Mar 80 p 8 SK

[Excerpt] The Ministry of Science and Technology (MOST) plans to revamp the atomic energy administration system, elevating the status of the Atomic Energy Commission, among other things, to accelerate development of nuclear technology and safeguard methods. The plan will be materialized through the revision of the Atomic Energy Law, which will include elevation of the Atomic Energy Commission (AEC), an affiliate of MOST, to the status of being under direct control of the president.

An authoritative source at MOST said that the revision bill would also provide legal actions against nuclear business industries violating the regulations on safeguards and the management of radioactive materials. According to the revision bill, which was recently prepared by MOST, AEC will control all matters related to atomic energy and nuclear facilities prior to related ministries' actions. The membership of the AEC will be increased from the existing nine to an adequate number including vice ministers of related ministries such as the Energy-Resources Ministry and the Commerce-Industry Ministry. The most-proposed bill also eliminates the article that scientists should be more than two-thirds of the commission members because nuclear industries are not only related to science but also to political and economic matters.

Because of a growing need for adequate safeguards at nuclear facilities, MOST plans to strengthen regulations on the safety of nuclear reactors by making them into laws.

CSO: 5100

## GOVERNMENT TO LOCALIZE NUCLEAR SUPPLY BY 1986

Seoul THE KOREA TIMES in English 16 Mar 80 p 8

[Text]

The government plans to localize nuclear supply for pressurized water reactor (PWR) type power plants by 1984 and for light water reactor (LWR) types by 1986, it was announced yesterday.

This was contained in a long-term atomic energy development policy reported by Science-Technology Minister Sung Chwa-kyung to the National Council for Science and Technology.

At present, a nuclear fuel processing pilot plant with an annual production capacity of 10 MT is in operation.

A refinery and conversion plant will be dedicated during this year and facilities for fuel testing and waste disposal will be completed by 1983, according to the ministry plan.

It is envisaged that local nuclear fuel plants will be able to supply 100 MT for PWR type annually from the target year of 1984 and 200 MT for LWR type from 1986.

The basic plan is to shift reliance on the supply of uranium ore and enriched uranium from the United States to other countries on a gradual basis and to seek exploration of overseas mines by Korean investors, according to the policy report released to the press.

Through negotiations with

the United States, the Ministry of Science and Technology will try to lift the present ceiling for the supply of enriched uranium pegged at 5,000 under the Korea-U.S. Atomic Energy Cooperation Agreement, or raise it considerably.

To cope with the problem of nuclear waste which is expected to reach 8,200 tons by the year 2000, MOST will make efforts to develop reprocessing or permanent disposal methods in the years to come.

Predicting a shortage of enriched uranium supply from the 1980s, Minister Sung said that MOST would import breeder reactors designed to produce both power and new fuel at the same time.

"Breeder reactors are needed to conserve the nuclear fuel supply, to reduce the requirements for enriching facilities, and eventually to reduce costs," said Minister Sung.

In order to improve design and construction capabilities, the Korea Atomic Energy Research Institute (KAERI) will import techniques for breeder reactors and nuclear fusion from developed countries.

To localize nuclear power plants, Korea Nuclear Engineering Services, Inc., will develop technical capability in nuclear power plant design, engineering and construction management.

Some 130 Korean scientists will participate in the construction of Kori Power Plant Units 5 and 6. They will undertake 20 percent of total engineering. For the construction of Units 7 and 8 which will be completed in 1987, Korean engineers will undertake 37 percent of the work.

The Nuclear Engineering Testing and Evaluation Center (NETEC) will be established by 1983 to meet the urgent need for component localization and plant betterment capabilities for on-going nuclear power plant projects. NETEC will start operation in 1983, one year later than originally scheduled.

Minister Sung also reported that MOST would expand the Nuclear Training Center and the Nuclear Training Institute of the Korea Electric Company Ltd., to meet the ever-rising demand for nuclear engineers. MOST plans to set up a nuclear engineering department in the Korea Advanced Institute of Science in 1981.

According to the report, Korea's requirement for nuclear manpower is estimated to increase to 8,420 by 1988.

Minister Sung emphasized diplomatic efforts to secure a favorable position in the field of nuclear science. In pursuit of international cooperation, Minister Sung said, the government would conclude agreements with many foreign countries.



## BRIEFS

**NUCLEAR EQUIPMENT PRODUCTION**--Hyundai Heavy Industries Co has recently won authorization by the ASME of the U.S. to use quality assurance stamps, the "N Stamp" and "NPT Stamp." This marks a turning point in Korea's production of nuclear reactors because ASME authorization is an essential prerequisite to the manufacture of nuclear power generating equipment. The authorization was given by the visiting six-man ASME screening team after a series of tests of Hyundai Heavy Industries' equipment, organization, and quality control systems, as well as its safety operation and product-handling processes. Hyundai Heavy Industries is the first firm in Korea and the second in Asia to win this international recognition of its qualifications to manufacture nuclear power equipment. [Excerpt] [Seoul SEOUL KYONGJE SINMUN in Korean 18 Mar 80 p 3, Seoul U.S. Embassy Translation]

**KORI NUCLEAR PLANT**--Kori Nuclear Plant unit 1 went into operation yesterday after one-month repair work. Unit 1 went into readjustment operation with 60,000 kw Friday and is scheduled to begin commercial operation on March 15, the Korea Electric Co. said yesterday. The plant, with a rated generating capacity of 587,000 kw, came to a halt because of hydrogen gas leakage in the turbine generator portion on Jan. 30. The repair was done by the Korea Electric Co. and the General Electric Co. of Britain, supplier of unit 1. [Text] [Seoul THE KOREA TIMES in English 2 Mar 80 p 7]

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## THAILAND

### BRIEFS

URANIUM DEPOSITS--According to a series of preliminary surveys, radioactive minerals, especially uranium, exist in several provinces, the engineering faculty of Chulalongkon University reports. A news document of the Institute of Research and Development named the provinces of Khon Kaen, Uthai Thani, Rayong, Phuket and Phang-nga as the areas where the radioactive ores exist. The major source of radioactive ores are found in sandy rocks in Phu Wiang District in Khon Kaen Province, the new document added. The report said sources of radioactive ores were found in every region of the country. [Text] [Bangkok BANGKOK WORLD in English 7 Mar 80 p 3 BK]

CSO: 5100

## BRIEFS

**SECOND JASLOVSKE BOHUNICE UNIT**--The start-up process on the second V-1 unit at the first Czechoslovak nuclear power station at Jaslovske Bohunice has been completed on Saturday morning, 15 March 1980. The reactor became critical at 1027 hours. An outstanding contribution to this achievement has been made primarily by the experts of the Czechoslovak and Soviet International Brigades of Socialist Labor. Based on the socialist contract, the brigade will link the second power station unit to the electric power lines to contribute electricity on the occasion of the 25th anniversary of the liberation of Trnava okres by the Soviet Army. Just as the first unit, the second one also has a capacity of 440 megawatts. It is the same amount, for example, as that which will be used this year by the city of Bratislava. [Text] [Ostrava NOVA SVOBODA in Czech 17 Mar 80 p 1]

**NUCLEAR POWER EXPANDING**--The program of the Czechoslovak nuclear energy expects to add to its resources 12 VVER-440 and four to five VVER-1000 reactors by the year 1990. In the first stage, we will concentrate on the industrially and operationally proven water pressure reactors of the Voronezh type. These will be introduced in the V-1 and V-2 nuclear power stations in Jaslovske Bohunice and Dukovany--here the expected performance is to be 3,520 megawatts of installed capacity--and in electric power station at Mochovce in okres Levice. The second stage will be aimed at higher output VVER-1000 reactors which are under construction in the Soviet Union and by the time we will start on them they will have undergone the operational testing. In comparison with the earlier types, their construction will be less material and labor intensive and will operate more efficiently. They will be used for power stations to be completed in the second half of the Eighth and beginning of the Ninth Five-Year Plans. By 1990, the classical thermal power stations will still be contributing more than one-half of the installed capacity. Even when the importance of the hydroelectric power stations will slightly increase, they will remain a significant part of the growth of the nuclear power stations with about 10,000 megawatts capacity and their contribution to the overall composition of the energy sources will increase to about one-third. [Text] [Prague SVET HOSPODAŘSTVÍ in Czech 4 Mar 80 p 1]

## HUNGARY

### OFFICIAL INTERVIEWED ON PAKS NUCLEAR POWER PLANT PROJECT

Budapest NEPSZABADSAG in Hungarian 9 Mar 80 p 5

[Interview by Ervin Tamas with Benjamin Szabo, Commissioner of the Nuclear Power Plant Project]

[Text] The town of Paks has much to thank to the Danube. Three hundred years ago, the river provided power in this area to about 150 water mills and today no nuclear power plant could be built here without the old river, because the availability of water is an indispensable condition of the plant's operation.

This construction is a milestone in the history of Hungarian industry; at Paks, the worn cliché "gigantic" received a new meaning. The term describes the effort which is characteristic for this work; the dimensions, the quality requirements are exceptional. Gigantic and unaccustomed is the task, with which at present already 10,000 people are struggling, day after day. Their goal is to ensure that by next year, the first reactor unit will be in regular operation, supplying electric energy to the country. As an introduction, Benjamin Szabo, the Commissioner of the Nuclear Power Plant Project, said simply, "You cannot learn from a book how to build a nuclear power plant".

[Question] At present, about 700 nuclear power reactor units are in operation or under construction throughout the world, including four at Paks. Actually, what do we have to learn here? Perhaps how to ensure the high quality of the work?

[Answer] Disregarding a few exceptions, there is hardly any operation within the framework of nuclear power plant construction, that we have not already used during previous larger construction projects under production or laboratory conditions. However, there are no domestic examples for the size of the works and the requirements for very high quality, which in this case, is the warranty of safety, and all this effort must be carried out not in the plant but under field conditions. These three factors together create a relatively new task. Financially,

last year, we executed works up to the level of 7 billion florints. This included a relatively small amount for very expensive mechanical equipment. The intensive period of the technological mounting will start this year.

During 1979, the general building contractor responsible for the construction executed works to the extent of 2 billion florints, on the "soul" of the nuclear power plant, the main building. Never before was such a large sum spent in Hungary within one year at a single building site. In particular, no single enterprise has spent 2 billion florints on a single building. The size of the effort may be better perceived if we look behind the figures. The building required the handling of 45,000 cubic meters of reinforced concrete. Although we know how to work with reinforced concrete, it was not a small job to handle such a large volume, under such strict technological and quality conditions. We did produce heavy concrete although mostly under laboratory conditions. Now then, we used up more than 1000 cubic meters of this material, the specific gravity of which is nearly twice as high as that of standard concrete, under exceptionally strict and difficult technological conditions. For reasons of radiation safety, the reactor and its accessory systems will be installed into a reinforced-concrete building that may be compared with a box with a special geometry. Both the internal and external surfaces of this building will be lined with steel plate, in order to ensure a hermetic closure. A single reactor unit required 60 km long plate weldments on the walls - and not just any which way! Keep in mind that I am only talking about the "curiosities" of the structure .... In my opinion, the potential strength of the Hungarian industry is quite sufficient to build a nuclear power plant. However, this does not exclude the fact that we still have to learn a lot, and we must focus our strength, especially during the construction of the first unit.

[Question] Great effort has been made, but delays still occur. The reasons include design problems, lack of organization in the execution, and the delays in the delivery of certain items. How could you identify the conditions which presented difficulties for the construction effort?

[Answer] The Soviet Union started the operation of the world's first nuclear power plant in 1954, and 10 years later, it started to operate the first industrial-scale nuclear power plant. On the basis of this plant, it developed a series of standard units, which provides an opportunity to the CEMA (Council for Mutual Economic Assistance) countries to build their own nuclear power plants. However, the nuclear technology advances very fast, and if the designer wants to take advantage of the improvements, nearly every reactor block must differ from the previous one. In addition, in 1973, the Soviet Union made the safety requirements more strict, and this made necessary to introduce significant modifications. The Paks Nuclear Power Plant is among the



first ones to be built on the basis of the modified plans.

It became obvious by the middle of the 70s that in the future, all of the CEMA countries would like to rely on nuclear energy. The increased demand could be satisfied only by ensuring that the Soviet Union will not be the only supplier of nuclear power plant equipment, but by creating additional manufacturing capacity, we work together to solve jointly the problem of fabricating the equipment needed for nuclear power generation. At the beginning, the preparations were drawn out, but at present, the socialist countries make an exceptional effort to fulfill their obligations. In any case, the Paks plant will be one of the first nuclear power plants, the equipment of which will be fabricated on the basis of Soviet plants in several of the friendly countries. The reactor will be obtained from Czechoslovakia, and equipment will be supplied by the German Democratic Republic, Poland, Bulgaria and we ourselves will supply more instruments and mechanical equipment than we anticipated during the first years.

I left the third cause of the delay, shortcomings in the preparedness of the domestic industry, to the last. This does not mean that this factor is less important for causing delays in the work than the other aggravating circumstances, but rather that it is closely correlated with them. Not only did we have to learn how to build a nuclear power plant, but we had to complete the work within strict deadlines! Unfortunately, we were somewhat late in finding out what a large task this project represents, and that this project is not just one among many. Several times, we believe that only the lack of planning interfered with the work, but now, when all documentation became available, we found out that the slow rate of construction was also due to the lack of skilled workers, poor organization, carelessness and a happy-go-lucky attitude. I am using this example only to prove that the effects of the above-mentioned main impediments should be examined only jointly. Without trying to look for excuses, I would like to point out that the construction of nuclear power plants presents serious difficulties and problems, even in the industrially developed countries.

[Question] The seven regional enterprises which "provide assistance" at Paks acquired the nickname of "The Seven Dwarfs". Was it worthwhile to detract them from the work that they carried out within their own area?

[Answer] First of all, I would like to make a correction: this nickname lasted only one or two months. These enterprises refuted that designation by their achievements. Two years ago, when it became obvious that there will be delays with respect to the original plan, the party and state leadership decided that the local effort must be strengthened. The Ministry of Construction and Urban Development resolved

the problem - in my opinion correctly - not by transferring personnel from one enterprise to another, but by appointing seven county enterprises which formed two consortia which assumed the responsibility for contracting specific tasks, thus relieving the overloaded State Trust of the Building Industry No. 22. The problem at Paks was not the lack of manpower as such, but the lack of craftsmen within certain trades in short supply (carpenters, welders, reinforced-concrete workers) who were greatly needed, including skilled experts who know all the tricks of their trade. Such people are usually unwilling to leave their mother company, not even as a worker on loan. When the decision was made, it was taken into account, that in addition to field construction, certain background tasks had to be carried out also. These enterprises came to Paks two years ago, indeed because they were instructed to do so, but now most of them are glad to stay on, because the nuclear power plant provides them a long-range opportunity to work - and I hope also, because they discovered a wealth of new technology that will help them to enrich the work skills of their labor force. I believe that the nuclear power industry will play a decisive role for many decades in the Hungarian industry. Furthermore, the enterprises which are working here today will become important in establishing this nuclear power industry.

[Question] What were the results of the wage scale initiated at the construction site and of the continuous work schedule introduced there?

[Answer] Many of the outsiders believe that people earn a lot of money at Paks. If this were so, there would be no labor shortage in the most important trades, and there would not be such a fluctuation in the number of the good skilled workers as at present. Most of the people who earn good money here probably would earn the same amount elsewhere, because nowadays outstanding skilled workers are well paid everywhere. A large income can be earned only by exceptionally hard work at Paks also. I am not referring to the allocations by the enterprises, because people would receive that, even without the nuclear power plant, except that the enterprises provide larger sums for this purpose. This wage preference, approved by the government, may be used in various ways. For example, a Commissioner's premium is made available every month as a reward for completing a certain task, considered to be of critical importance. Thus, this amount of money is related to some specific work, regardless of how many enterprises are involved in the effort. The general opinion is that with a little "side income" one could earn the same amount of money closer to home, or that the wage differential is not large enough to induce people to stay away from home for longer periods of time. Thus, this premium, although it represents a strong inducement was found not to be sufficient at the very area where we need it most: to retain well trained experienced skilled workers.

The continuous work schedule which is being used by nearly all construction companies, is not considered an unambiguous success ... however, in my opinion, a nuclear power plant cannot be built by any other way than by continuous work. Let us take an example: if a task requires 100 people for each specialty, but only ten are able to work at a given time, then the conventional work schedule would require two weeks to carry it out. By working day and night, the work could be completed within 5 days. There is another, not negligible factor: the construction of the power plant requires expensive machinery because of the high price and lack of space, but the number of the items must be kept low. The lack of cranes, the shortage of lifting capacity - often in spite of the 24 hour operation - beats us down and impedes progress.

[Question] The guaranty of the fulfilment of the set goals requires the teamwork of 50 enterprises which are working at the site. It seems that contractual relations were not sufficient to achieve this. Will the Commissioner be able to achieve an agreement for the enterprise to operate with one will and a unified action?

[Answer] In our country, a branch of industry, an economic process, or a project is managed indirectly by the upper echelons of the government leadership through a management chain, using various controlling and stimulating factors. Deviations from this scheme are permitted only under exceptional circumstances, for example in case of flooding, when a commissioner is named to direct the defensive activities. The national economy has a high stake in the availability of the Paks nuclear power plant by set deadline. At the same time, the task is quite complex - we do not have the required technological experience, and many obstacles hinder and potentially interfere with the work. Under such conditions, it was absolutely necessary to view the situation from a point "outside of the portfolio", assuring direction by a single person - which means that the whole project must be considered as if it were a single enterprise. The task of the Commissioner is to direct the execution of the work, within the authority of his instructions under consideration of the local situation and requirements; however, he must also provide assistance to ensure that the enterprises will be able to act independently when the next power plant is built. By pulling the oars together, the local managers learn all they have to about their duties, without having an opportunity to "talk away" their responsibility and to shift the blame for work delay to others, eliminating also the possibility to cover up their own mistakes.

Of course, this type of management is not a miracle cure; conflicts do arise, even under such conditions. The commissioner is able to issue instructions to the management of the enterprises, and his authority includes the transfer of means of production and of the labor force, if deemed necessary. However, whenever he does this (and lately, he had to



do it quite often) he interferes in the internal affairs of the enterprise, and violates their interests. Often, if time would permit it, it would be better to follow the path of reconciliation. However, considering all this, I feel that nowadays, most people accept this method of management, at least because we achieved significant successes with such a teamwork. Most of the enterprises working here were quite successful last year; for example, State Construction Enterprise No. 22 increased its productivity considerably, proving that it becomes more and more possible to satisfy the high quality requirements. Our greatest joint success this fall - including the designers, the planners, the builders and the Soviet site advisers - was that, with a delay of only 15 days with respect to the original deadline, we were able to start the operation of the giant crane at the reactor building, which is an indispensable tool of the installation. Work volunteered in honor of the forthcoming party congress also helped to increase the rate of construction, the goal of which is to complete as rapidly as possible the first reactor which will provide electric energy to the country.

[Question] In the meantime, the city of Paks will also grow out from the ground next to the Paks power plant .....

[Answer] You cannot carry out a major project from barracks. There is also another reason; the plans provide for an enlargement of the originally 1760-MW power plant by an additional capacity of 2000-4000 MW, thus the construction could last 15-20 years, in parallel with the nuclear power plants already in operation. Such a long range task cannot be carried out without a suitable infrastructure. Even the construction workers and riggers assigned to temporary housing spend several years here. In addition, the operation requires an urbanized Paks; otherwise, we will not be able to attract the highly qualified skilled workers, technicians, and engineers with advanced training. The current time is the most difficult period of Paks. At present, about 10,000 people work on the construction, spending part of their time in the town. The 2000 apartments we built at the settlement are not sufficient to satisfy their requirements. There was, and still is, a need even today for shops, cultural establishments, playing fields and stadiums, care centers and good transportation. People who visit the ABC Department Store during the day say that this is a waste of money, that it is unnecessary to have such a large store. I suggest to them that they visit the place in the evening, after 5 o'clock, when within two hours, 3,500 people are served and very often, as many as a hundred shoppers pass every minute through the doors, and they are "special" shoppers! These people have only a single store, and when they are through with their work, they have only a few hours left for eating dinner and entertainment. Most of them go early to bed because the alarm clock rings early in the morning and in any case, the 11-12 hours long work-shift tires them out. Luckily, the urban Paks, the town, is not a stranger to the Paks power plant - the inhabitants are interested in the

construction, because they are well aware of the importance of the nuclear power plant to their settlement.

[Question] The law concerning nuclear power was debated and approved this very week by the National Assembly. To what extent will this decree, which outlines the peaceful and safe utilization of nuclear energy, be able to remove any ill-feeling and prejudice related to the power plant?

[Answer] In my opinion, the promulgation of the law is an important event, because it provides the support of the power of the law to the regulations, efforts and activities related up to now to the peaceful application of atomic energy, and raises further challenges to the technological and economic leadership. However, the law can resolve only indirectly the fears and prejudices arising from lack of knowledge. In order to resolve this concern, we will use every means to inform and educate the people, including the mass media. Many people connect the word "bomb" to the word "atom" although the word "technology" is better suited, because its field of application becomes increasingly broad: its services to mankind range from healing arts to ice breakers. It is an odd paradox: nuclear energy is the first technological branch in the history of industry during the development of which, the safety requirements and environmental protection considerations were taken into account, long before it fully evolved. Half of the investment spent for the development of the nuclear power plant serves the purposes of safety. The first domestic nuclear power plant satisfies the most modern principles of radiation safety: we taken into account any potential failure, the probability of which lies within ten thousand reactor years. The technical experts who were transferred here from other branches of industry, first viewed this as a waste of money, because we were providing protection against highly improbable events. It would be good if everybody would realize and understand that the loud protests against nuclear power plants originate from capitalist countries, and that political and business interests are hiding behind all of the debates and manipulations.

Please do not misunderstand me; I do not want to say that nuclear power plants do not present risks. Yet, nearly all of our "spare ropes" have an additional "spare rope". This technology is vitally important for the future of mankind: instead of looking at it askance, we should befried it, i.e. we should get acquainted with it.

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CSO: 5100



## MEASURES TAKEN FOR DISPOSAL OF NUCLEAR WASTE MATERIALS

Budapest HETFOI HIREK in Hungarian 10 Mar 80 p 5 WA

[Text] Last week the national assembly passed the bill pertaining to nuclear energy. It stated, among other things, that atomic energy may be used only if maximum security is provided for human life and health, the environment and material goods. It must be used in such a way that under no circumstances may it produce harmful contamination to the population and the human environment.

In response to a question about the safe storage of isotopes and other nuclear wastes, Arapd Veres, director of the Isotope Institute of the Hungarian Academy of Sciences, responded as follows: "In the mid-1950's only 10 institutes used isotopes. Even then it was necessary to make arrangements for the disposal of used radioactive material and wastes. At that time an isotope burial site was established at Solymar. However, this no longer meets the increased requirements. Today, 300 institutes belonging all the way from the food to the pharmaceutical industry use isotopes. Radioactive wastes, including cobalt used to treat cancer, have increased substantially. Consequently, the National Atomic Energy Committee recently built a multiple bunker with concrete walls in the vicinity of Puspokszilagyi. This modern isotope cemetery will be used for disposal of various radioactive substances including contaminated parts from the Paks Nuclear Power Plant. The substances previously buried at Solymar will be transferred here, too. However, a special underwater storage facility will also be established at Paks. It will be used to store burned out but still hot fuel rods.

Over the past quarter century 150,000 isotopes of various kinds and dimensions have come into use. A record is maintained of every one of them. A computer keeps track of how many there are, where, their half life and what has become of those which have been used. They are transported in vehicles which are so secure that no contamination could occur even in case of a traffic accident. Collected wastes are compressed in bitumen, sealed in rust-proof steel tubes and encased in steel drums. They may also be deposited in storage tanks.

The isotope bunker at Puspokszilagyi is so secure that it would be safe for even a residential site.

**BRAZIL'S FIGUEIREDO TO DISCUSS NUCLEAR PACT DURING CHILE VISIT**

Rio de Janeiro O GLOBO in Portuguese 13 Feb 80 p 16

[Text] Brasilia (O GLOBO)--A nuclear agreement between Brazil and Chile, as well as possible risk contracts for oil prospecting by Petrobras on the continental shelf south of that country are the topics to be discussed by President Joao Figueiredo during the visit he is to make to Santiago during the second half of this year.

Chile's ambassador, Fernando Zegré Santa Cruz declared yesterday, when this information was given, that the date of the visit has not yet been fixed, since it is still so far off. He commented that September and December are good months to visit Chile.

A delegation of 15 Brazilian entrepreneurs, led by the president of the Automobile Manufacturers National Association will go to Santiago on March 17. However, their visit will not have the character of a preparatory mission to that of the president.

Ambassador Santa Cruz announced that the entrepreneurs will be received by Finance Minister Sergio de Castro, who "has the same powers as Delfim Netto in Brazil."

According to Santa Cruz, the Chilean market is open to the import of Brazilian products without concern for the balance of payments between the two countries, which is favorable to Brazil.

In 1979, trade between the two countries amounted to \$800 million, somewhat over half of which was for sales of Brazilian products, mainly automobiles.

He said that 10 percent of Chile's copper production, estimated at 120,000 tons, is being exported to Brazil, and that an increase of that volume is not feasible for lack of sufficient supply. Ambassador Santa Cruz declared his country produces nothing besides copper that could be of interest to Brazil at the present time.

## Nuclear Agreement

Santa Cruz admitted the possibility of signing an agreement of cooperation in the area of nuclear power. He said that Chile has a nuclear program to be implemented within 10 or 15 years. Nuclear reactors have already been purchased from Great Britain and France, and some equipment from Spain. However, said Santa Cruz, nuclear power has a low priority in Chile, since the cost of implementing the program is very high. Therefore, more interest is being paid to hydraulic power.

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# PRESIDENT AUTHORIZES INCREASE OF NUCLEBRAS CAPITAL

Rio de Janeiro O GLOBO in Portuguese 4 Mar 80 p 23

[Text] Brasilia--President Figueiredo yesterday signed a decree authorizing an increase in the capital of the state-owned enterprises: Brazilian Nuclear Corporation (NUCLEBRAS) and the Paranaiba Valley Mining Corporation (VALEP). The corporate capital of NUCLEBRAS will increase from 1,842,564,185 to 5,449,473,700 cruzeiros, divided into 2,972,440,200 common shares and 1,981,626,800 preferred shares at a nominal value of 1,10 cruzeiros each.

VALEP received authorization to increase its capital by 1,297,000,000 cruzeiros to 2,158,000,000 cruzeiros by stock subscription. VALEP is a subsidiary of the Rio Doce Valley Company.

The authorization for NUCLEBRAS to increase its capital does not mean that the company will have those funds at its disposal this year. According to company sources, it will have greater accreditation to obtain credits from national as well as foreign financial institutions.

The company is pleased because with the increase of its capital, it is certain that NUCLEBRAS will be able to complement the budget approved by the government for 1980, which is in the amount of 15 billion cruzeiros.

NUCLEBRAS has four subsidiaries with German partners: NUCLEBRAS Mining Support Corporation (NUCLAM), in which the partner is Urangesellschaft. The subscribed capital is 100 million cruzeiros and NUCLEBRAS holds 51 percent; NUCLEBRAS Engineering Corporation (NUCLEN). The capital is 30 million cruzeiros, 75 percent of which belongs to NUCLEBRAS and the remaining 25 percent to Kraftwerk Union Aktiengesellschaft (KWU); NUCLEBRAS Isotopic Enrichment Corporation (NUCLEI), with a subscribed capital of 700 million cruzeiros, 75 percent of which belongs to NUCLEBRAS and the remaining 25 percent to the Steag and Interatom companies. Finally, the NUCLEBRAS Heavy Equipment Corporation (NUCLEP), which has a capital of 292.8 million cruzeiros, 75 percent of which belongs to NUCLEBRAS and 25 percent to a consortium made up of KWU, Gutehoffnungshutte Sterkrade Aktiengesellschaft and Vereinigte Osterreichische Eisen-und Stahlwerke Alpine Montan Aktiengesellschaft.

When the capital authorized yesterday is integrated, the German partner may effect it by supplying equipment to the various factories ensiaged in the nuclear program.

NUCLEBRAS HEAD DISCUSSES NUCLEAR PROGRAM

Brasilia CORREIO BRAZILIENSE in Portuguese 1 Mar 80 p 11

[Excerpts of interview with NUCLEBRAS President Paulo Nogueira Baptista, in Brasilia, on 29 February]

[Text] The president of the Brazilian Nuclear Corporation (NUCLEBRAS), Paulo Nogueira Baptista, guaranteed yesterday that the financial resources necessary to complete the Angra-1, -2, and -3 plants are available in this year's budget for the electric sector and the funds also permit the beginning of construction on two more plants of the Angra-2 type--units 4 and 5 of the Brazilian nuclear program.

In an interview granted in Planalto Palace, Paulo Nogueira Baptista and engineer Rex Nazare Alves, interim chairman of the National Nuclear Energy Commission (CNEN), covered primarily questions pertaining to financial resources and the current concern about safety surrounding the Brazilian nuclear program.

Badgered by the insistent questions of the reporters about the supposed safety problems of the Angra dos Reis nuclear plants, Paulo Nogueira Baptista expressed his annoyance over that excessive concern, pointing out that the reporters should concern themselves also about the military uses of nuclear energy, that is, with the manufacture of a nuclear weapon, a course that, according to him, is not envisaged in the Brazilian atomic program.

In view of the delay of the original timetable, which envisaged the installation of eight nuclear plants by 1990, the president of NUCLEBRAS indicated that as a matter of fact that was not a delay because there was a modification of the timetables. He indicated that construction of the nuclear plants will end by around 1995 and that a uranium reprocessing plant will go into commercial operation beginning in 1990, which will supply fuel to the plants. That reprocessing plant may begin operating in 1987 but it cannot go into commercial operation until 1990.

The interim chairman of the CNEN, engineer Rex Nazare Alves, who replaced General Hervasio de Carvalho, explained the present Brazilian position regarding the safety problem of the nuclear plants, indicating that the



process is selfcorrective, that is, there are risks and they are accepted but the system is being improved. Nazare also indicated that concern about eliminating risks may lead to delays in the timetable, which could still be considered a benefit because at the present time, the interruption of one day of operation of a nuclear reactor means [a loss of] \$1 million.

#### Press

Both in the words of the president of NUCLEBRAS and in his introduction by Minister Social Communication Said Farhat, there was repeated criticism of the work of the press, which the officials blamed for distortions and omissions.

"Perhaps because of a lack of information, there is an impression in some sectors of Brazil that in introducing nuclear energy among us, the country is venturing on a field that is still completely unknown, completely new, that it is entering an area without yet having a well-defined experience about the use of nuclear energy," said Nogueira Baptista. The president of NUCLEBRAS stressed the fact that at the present time there are 235 nuclear plants in operation, an equal number of plants under construction and 113 on order.

Ambassador Nogueira Baptista said that the low consumption of electric energy in Brazil will tend to increase and that almost all of the hydraulic potential will be utilized by the year 2000. Brazil consumes 1,000 KWH per capita per annum, which indicates a consumption well below European standards, which means that we are 25 years behind. He pointed out also that the identification of uranium-bearing reserves beginning in 1974, that is, when the Brazilian nuclear policy was defined, increased by 11,000 tons to 215,000 in 1979. The present reserve, said Nogueira Baptista, is already sufficient to fuel about 35 nuclear plants of the Angra-2 type for their entire useful life (around 25 years).

For the establishment of the nuclear program, an option was chosen that guaranteed gradual development parallel with the full utilization of hydraulic resources for the generation of electric energy. The first problem stemming from that option was the progressive acquisition of know-how through construction of an average of one plant per year. Later with the acquisition of technology resulting from the actual construction of those plants, a basic condition to effect the transfer of technology, the country would be qualified to assume full responsibility for the nuclear industry. That full mastery of technology would obviously guarantee the full capability to handle the demand for electricity.

Ambassador Paulo Nogueira Baptista concluded his initial presentation by reaffirming the intention of the Brazilian Government to proceed with the execution of the program as it was drafted, to proceed with construction of the plants programmed as well as all the installations pertaining to the nuclear fuel cycle so that the country can in fact achieve the level of technological autonomy. For that purpose, the government has already



authorized the inclusion of adequate funds in the budget for the electric sector to insure continuity of the construction of the Angra-1, -2, and -3 plants and to permit initiation of construction of two more units similar to the Angra-2 plant.

### Safety

The interim chairman of the CNEN began his presentation about the problems pertaining to safety in the program, trying to show that radioactivity is an everyday fact of life for everyone. Rex Nazare Alves pointed out that the CNEN is concerned first of all with the safety of the people who operate the nuclear power plants and with the population in neighboring areas, as well as the preservation of the environment. Nazare Alves indicated that one-fifth of CNEN personnel hold doctorates, and almost half, with master's degrees, concern themselves with the aspects of the methodology of safety.

The interim chairman of the CNEN pointed out that the Brazilian nuclear program is covered by a system of safeguards which runs parallel with our bilateral agreements on international cooperation that insure the peaceful uses of nuclear energy.

Rex Nazare invited the scientific community to appraise the safety systems in operation.

Following are excerpts of the interview:

Question: I would like to know why the Brazilian Electric Power Corporation (ELETROBRAS) is not present at that table?

Said Farhat: The format adopted for this meeting envisaged only replying to questions that are being raised regarding the nuclear program properly speaking and its practical applications in Brazil. That is the only reason why ELETROBRAS is not present here. But if there is any need, there will be another occasion when NUCLEBRAS, the CNEN as well as ELETROBRAS and concessionaires concerned will be present.

Question: The correlation of the cost of the nuclear plants is around \$15 billion, indicated as the initial cost. It so happens that that represents one-third of the current debt. Could you explain a little the relationship between the costs of electricity and the cost of nuclear energy.

Paulo Nogueira Baptista: In the first place, I would like to call attention to the following fact: As was demonstrated here and not for the first time, this is a program of progressive national provision of all elements that enter into the construction of a nuclear power plant, from the project engineering to the manufacture of components. So that presumption that in ordering the plants, we are assuming commitments that necessarily translate into import expenditures, import costs, is not correct, because the sequence of the program is based on progressive national participation in such a way

that we should achieve an index of 80 percent national participation by the eighth unit in the program. In fact, what we are doing is building plants in Brazil with foreign cooperation, a cooperation that will be declining as we increase the number of plants. So that impact to which you refer does not exist.

If we consider the cost of an installed kilowatt of power, without interest, during construction, at about \$1,500--which was the hypothesis you adopted because the program will total 10,000 megawatts--10 million kilowatts at \$1,500 would add up to the \$15 billion to which you referred. That absolutely does not translate into any expenditure of foreign exchange. We even have an estimate of what foreign and national participation would mean in the overall program--you will see that there at the top of the chart; in the overall investment, that foreign participation is in the order of 20 percent. So it would not be \$15 billion but \$3 billion.

The use of the dollar as a reference, which creates that problem of interpretation, is due to the fact that the dollar is a currency that, shall we say, is more reliable, of more stable value, despite its recent devaluations, for figuring on economic terms. It would be very difficult to use the cruzeiro inasmuch as the successive devaluation of the national currency would create difficulties in making comparisons in time. So the reference of the cost in dollars does not mean an expenditure in dollars.

Question: There are press reports to the effect that the nuclear program is going to be delayed more than 5 years. The second question: There are rumors also in the press to the effect that there is opposition within the government to the nuclear program, that the minister of planning is opposed to that program.

Paulo Nogueira Baptista: As a matter of fact, the program envisaged originally was that the eight plants--Angra-1 plus eight plants--would be installed by the end of the decade. That was the schedule established by ELETROBRAS' Plan 90, presented in 1974. But experience gathered in the construction of the first units--and here I am referring also to Angra-1, and it is also valid with regard to Angra-2 and Angra-3--all the problems that arose in that national experience, and also international experience showed that it was necessary to consider longer timetables than those originally established. We initially worked with the data from Plan 90 in a plant timetable in the order of 7 years and today we are convinced that that timetable should be in the order of 9 years, as was cited here by the acting chairman, that is, about 108 months. That is a more realistic and more feasible plan.

So the first result of that is a natural stretching of the program, but that does not in itself mean a loss or delay; on the contrary, it is going to enable us to execute the program originally planned under better safety conditions, better financial conditions, and also with a guarantee of better national participation at the appropriate level.

Now, obviously, there have been delays, which are known and were never denied by the government--it is not a matter of rumor because they are well-known facts--there was a delay specifically in the construction of Angra-2 and Angra-3 because of technical problems pertaining to the foundations, which obviously has nothing to do with that standard timetable to which I referred.

We do not deny those delays, we admit them. The government never denied them; they are not the result of any political decision to delay the program; on the contrary, the political decision is to go ahead with the program in its entirety.

Minister Said Farhat: I would like to make a clarification with regard to the rumors mentioned by them and possible differences inside the government regarding the execution of the Brazilian nuclear program.

The clarification is the following: This subject is a matter decided by the federal government. President Joao Figueiredo has already expressed very clearly the Brazilian decision to implement the international agreements connected with the execution of that nuclear program and since the matter has already been decided, it is no longer subject to differences or disagreements.

Question: Deputy Flavio Marcilio told the press that he learned of concern on the part of the German Government and the private sector itself that Brazil was having difficulties in fulfilling the agreement because of the problem of lack of funds. I would like to know if you have learned of those concerns, especially since we obtained that information from the Ministry of Mines and Energy, that you had told Minister Cesar Cals that the 20 million approved in the budget would not be enough for NUCLEBRAS to execute the nuclear program at the intended pace.

Paulo Nogueira Baptista: The problem which your question raises was touched upon by me when I tried to reply to a question from your colleague.

As a matter of fact, those concerns to which you referred, which were gathered by the president of the Chamber of Deputies--according to press reports, because I have not had any direct contact with him in that regard--were to effect that there was apprehension in Germany regarding the implementation of the program. But those apprehensions as Foreign Minister Saraiva Guerreiro pointed out, are based on the fact that the reports that reach people are furnished by the Brazilian newspapers and, unfortunately, the Brazilian press has not been very faithful to the facts of the Brazilian nuclear program.

Specifically with regard to the concern to which you refer, that I had reportedly told Minister Cesar Cals about, that did not happen, inasmuch as our investment was discussed with him, completely approved and supported by him before the minister of planning. The famous discussion reported in the newspapers regarding the lack of appropriations for NUCLEBRAS did not occur.

Question: You have just said that there is not yet a definite site for the next two plants. You do not really want us to believe that a site for one or two nuclear plants can be determined in a few months, in the 9 remaining months of this year. That site has surely been determined and it is easy to figure out that it is no longer possible to install nuclear plants in the area of the FURNAS concession. That means that it is obvious that the next nuclear plants are going to be installed in Sao Paulo territory because there is no other concessionaire at the moment in a financial position to undertake a project of that kind other than the Sao Paulo Power Company (CESP). I wonder if you could confess that the next two nuclear plants are going to be built in Sao Paulo.

Paulo Nogueira Baptista: Before trying to answer your question, I would like to make a small comment on some statements that preceded it. Obviously I came here to say everything, as is always the case.

Now, I do not believe it is true, correct, to say that the attitude assumed by some newspapers, or by some sectors, against the nuclear program stems from the lack of information because that is perhaps the subject about which there is the most information in Brazil. Furthermore, there have already been three congressional investigation committees in Brazil, we are now on the third; and in the national congress, specifically in the senate, there is vast documentation regarding all aspects of the problem from innumerable depositions presented by the officials responsible for its execution as well as by people not directly connected with its execution who testified for and against the program.

Therefore, I would not say that that statement to the effect that the lack of information is what produces or arouses opposition is correct. I do not agree with that viewpoint.

The government, I repeat, has never refused to provide information and has given it all whenever asked.

My hope is that when the government provides information it is published correctly, published completely, which does not always happen. Not only is the information sometimes not published, reported faithfully, but many times the report does not even correspond to the real facts. Many times there is a wide margin of imagination in the report which, in some ways, means a failure to comply with the obligation to properly inform the public, which is the natural corollary of the right which the reporters have to the information.



Rex Nazare Alves: As you yourself said, the study of a site is not done rapidly. I could tell you that, on the average--and that average is taken from the siting of 55 pressurized-water reactors--that study takes in the order of 16 months after a determination of the macroeconomic study cited by Ambassador Paulo Nogueira. After that siting, there is a complete assessment of the geological area and within the geologic area, a complete study of seismology, a complete study of the weather, the food habits of the local population, of the neighboring areas, of the problem of access for heavy components, of the assessment of areas of exclusion. And I would also like to point out that that area of exclusion is perhaps one of the points on which, instead of being attacked by the ecologists from time to time, the ecologists, on the contrary, should be pleased that that area of exclusion is an area in which the preservation of the ecology can be guaranteed up to 100 percent.

Question: You said that the sites of nuclear plants 4 and 5 have not yet been chosen. How about unit 3, has the site been decided?

Paulo Nogueira Baptista: Unit-3 will be located in the Itaorna site, that is, where it was originally planned. The only doubt that exists--but I believe that Professor Rex Nazare is in a better position than I to explain, because there are licencing problems involved--relates, shall we say, to the positioning within that area. Construction may take place still partially on piles as well as on a direct foundation, but within the Itaorna site.

Rex Nazare Alves: I only want to add, the positioning of Angra-3--as the ambassador said, the site is in Itaorna--only requires a small study of details in that site to determine the best position that would provide the greatest facilities in terms of construction. Those studies are being conducted and I believe that within 1 or 2 months we will be in a position to provide an exact position for the final location within the Angra site.

Question: Ambassador Paulo Nogueira Baptista, you said that in 1980 there will be allocations from the electric sector for Angra-2 and Angra-3, as well as Angra-4 and Angra-5. Could you be specific regarding those allocations.

Paulo Nogueira Baptista: I said that by government decision, in the budget for the electric sector for 1980, in addition to the funds necessary for continuation of Angra-2 and Angra-3 at the appropriate pace and the conclusion of Angra-1, provision has also been made for the funds to begin the construction of nuclear plants 4 and 5.

Question: But could you cite the amount of those allocations?

Paulo Nogueira Baptista: I believe there were 2 billion cruzeiros allocated to begin the work.

Question: Two billion for 4 and 5. What about the continuation of 1, 2 and 3?

Paulo Nogueira Baptista: That is information that the electric sector can give more exactly but I believe it was 10 billion cruzeiros.

Question: I would like to ask the following question: Would you as a technician, as a man who is working in the sector of nuclear plant safety say that they do not represent any danger to the Brazilian population. Would you make that statement before posterity?

Rex Nazare Alves: Let us refer to the words exactly as they were spoken. I said that it was our concern to guarantee that the plants would operate under appropriate safety conditions. To say that there is no risk would really be lying and we are not here to do that. What happens is that all of those measures, all of those concerns and that methodology that was demonstrated to you simply demonstrate that a whole combination of measures are taken as a sort of preventive therapy to prevent those accidents. And let us now take two examples of recent accidents.

There was, for example, the case of Three Mile Island, which was the worst accident that has occurred in a nuclear power plant up to the present time. That is also obvious. That was also amply reported. What happens is that whenever an abnormality occurs at an installation, we immediately seek out that experience so that, as feedback to our procedures, a system can be developed to guarantee our plants will operate under safe conditions. And if they operate under safe conditions, I guarantee you--and I would even undertake to pick a person who would like to take the measurement with me, to conduct a measurement in the area after Angra-1 is in operation and then go together to Guarapari--I will really prove that the radiation readings under normal operating conditions are higher in Guarapari than in the Angra region.

Question: Dr Nazare, you presumably do not subscribe much to the idea that the nuclear industry learns from its mistakes and for that reason becomes more perfect. When Angra was chosen for the site, the scientific community pointed out afterwards that it is one of the few places in Brazil where there is a geologic fault. Then there is Angra-2 with its foundation problem and much more expensive piling than originally envisaged. So why is Angra-3 going to be there and not some other place?

Rex Nazare: With regard to your statement of the position of the scientific community, I did not define well what is "scientific community." I am "scientific community." (Laughter)

ESTADO DE SAO PAULO: You are on that side?

Rex Nazare: I am not on that side. On the contrary, as the one responsible for safety, I have to be on the side of the people, because it is the only



way for them to really believe. And what happens basically is that, if we use basic reasoning, we will verify the following: There are a number of very large programs with the participation of the scientific community.

Question: With regard to the consumer, is the entrance into operation of nuclear energy going to reduce the cost of energy for the national consumer?

Paulo Nogueira Baptista: The energy the consumer is actually going to have available, electricity, is not labeled as being of nuclear origin, or of hydroelectric, thermal, coal or oil origin. He simply receives the final product, electricity. And the cost, the price of that electricity is established in terms of the costs of operation of each concessionaire and represents an average figured on the various types, the various forms of energy it uses to generate electricity. So your monthly electric light bill will not show a specific cost per nuclear kilowatt. It will be, let us say, included in the average cost of the concessionaire that operates nuclear plants.

Question: Minister Said Farhat, we are moving unequivocally that the Brazilian Government has already taken a decision on the nuclear question and that after that decision has been taken it is no longer the subject of disagreement or opposition. We still do not know the results of the nuclear congressional investigating committee. We are observing the increase of manifestations, including street demonstrations against nuclear energy. We are witnessing the continuing criticism of nuclear issues by the scientific community outside the government.

I would like to know what kind of democracy is that in which large sectors of the public and the parliament cannot influence a review of a decision already taken by the government?

Minister Said Farhat: Thank you very much for your question because it gives me the opportunity to make some pertinent clarifications.

The context in which the decision was taken and no longer subject to disagreements or differences was within the context of the government's decision-making process; that is, the question of the representative of FRANCE PRESS referred expressly to differences that might occur within the government. And there are no differences in the government because the matter has been decided by the appropriate authority.

As for the question of the participation of other branches of the government or sectors of society, all of organized society also bases the participation of its various sectors on processes that deal with a given chronology.

The national congress was not detached from the decision-making process as regards the nuclear agreement. Quite the contrary. The nuclear agreement was ratified by the national congress within its constitutional prerogatives.

At the same time, the national congress, also within its constitutional prerogatives, appointed three congressional investigating committees to investigate the aspects it deemed of interest with regard to the nuclear agreement and the execution of the Brazilian nuclear program.

With regard to the expressions of society or of sectors of Brazilian society, those manifestations have been listened to. However, thus far, the government has not found any reason in them to change the policy it adopted after very lengthy reflection.

I would like to cite the fact that ~~that~~ Brazilian nuclear program did not originate overnight but is the result of about 25 years of preparation, studies and decisions. I believe it began to take shape in 1955 with Adm Alvaro Alberto. Since 1955, the first commission was formed under the chairmanship of Adm Alvaro Alberto, whose name has been given to the Angra-1 plant and who has been devoting quite concentrated attention to this subject within the Brazilian Government. So that the government arrived at the decisions it took not out of impulse or without having reflected at length of them.

Question: I would like to know if the place where the so-called radioactive waste will be deposited has already been determined. Originally, the press reported that the site chosen was in the state of Espirito Santo, at the mouth of the Piraqueacu River, and that there had even been public demonstrations against that.

Rex Nazare Alves: The first thing about radioactive waste is the way it is presented to the public, and in that regard I would like to ask for the cooperation of you gentlemen in terms of, shall we say, a definitive clarification for the public; I place everything that is in the library of the commission, all the documentation, in that regard at your complete disposal.

We can begin to try to define exactly what is radioactive waste. What is called radioactive waste in fact is the waste that comes from various operations. And why does that fear exist? The fear is that at a given phase we might have to store radioactive residues whose life is in the order of tens of thousands of years.

Let us now try to equate that. Why the concern? The concern arises because the vessel that will have to hold or keep this waste has to last some tens of thousands of years. What happens is that on the average we live 60 or 70 years. So when we hear that something has to be kept for thousands of years, we become seriously concerned.

Now let us begin to equate the problem of waste beginning from its origin. There is waste in the operation of a nuclear installation, of a reactor. I have the list here of exactly what the figures are for those wastes produced, but we can easily verify from that list that is at your disposal if you want to see it that the waste with the greatest possible activity is Cesium-137, with a half-life of around 30.1 years.

Following that is strontium with a half-life of 28.5 years. What happens is that all of the remaining isotopes have a short life with reference to the normal operation of a plant.

After the plant goes into operation, the fuel element is removed. That fuel element contains a number of elements whose half-life is quite long. And a typical example of that is plutonium which our country intends to reuse.

So let us set it off from the word "waste"; it is such a vital waste that we need it to use in the fast breeder reactor.

What happens is that there is still present there but in much smaller quantities, radioactive wastes with a quite long half-life; in quantitative terms, Brazil will really only be faced with that type of waste the moment a commercial reprocessing plant is in operation.

To give you an example, the surface of the vessel that contains those wastes indicates in the order of 0.2 Roentgens per hour. Let us understand what that figure means. That figure is exactly one-fifth the amount we get when we take a chest X-ray. I do not want to say by that that I am minimizing the problem of waste. What we have to present in the case of the waste problem in a very rational way is that there is a danger; nobody can deny that risk. How is that risk being equated? Through processes that guarantee that it is going to remain in a given place, and in addition, for example, through the vitrification of that waste, which is one of the techniques being used today.

The second possibility when that time comes, in addition to vitrifying it or producing some other way a process that keeps it in a given place, we will also place it in a geologic location in such a way that we will have the double guarantee of the fixed position of that waste and its nonentry into the environment.

Paulo Nogueira Baptista: Minister Farhat, I would only like to make a simple comment on what was explained by Professor Nazare with such technical precision because I want to refer to a more political aspect of the question.

I find it extremely strange--and I pose that doubt to you gentlemen--that so much noise is made, that so much confusion is aroused about the risks stemming from the so-called atomic waste, which as a matter of fact are those highly radioactive residues that, for a reactor of the Angra type, amount to 2 cubic meters per year at the maximum--and tremendous confusion, a terrible doubt, is aroused about the matter, but we hear very little about the problems created by the generation of the same type of waste through the activity of some countries in building huge military arsenals.

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## NUCLEBRAS ADMINISTRATIVE CHANGES ANNOUNCED

### Administrative Chaos

Rio de Janeiro JORNAL DO BRASIL in Portuguese 7 Mar 80 p 18

[Text] In a period of 6 days, from 27 February to 3 March, the president of the Brazilian Nuclear Corporation (NUCLEBRAS) changed the company's administrative structure twice, creating veritable administrative chaos in NUCLEBRAS, which had barely managed to absorb the previous changes effected a year ago, also twice in succession (on 2 and 16 February 1979).

Last week's changes affected mainly the directorates of financing, mining and beneficiation, and administration held by Vicente Costa e Silva, Eduardo Calmon and General Jose Pinto Rabelo. According to NUCLEBRAS sources, the changes stem from the intention of Nogueira Baptista to clean out those directorates, especially those of financing and administration, whose occupants were selected by Minister of Mines and Energy Cesar Cals.

### Revolt

On 27 February, the president of NUCLEBRAS issued Resolution No 008/80 changing the basic organic structure of NUCLEBRAS and Resolution No 009/80, complementing the first, redefining the area of activity of the directors. Both were to go into effect on 1 March.

According to Resolution No 008, the 14 general superintendencies of the company were reduced to 12, with the abolition of the general superintendency of Pocos de Caldas and the federal superintendency of mineral engineering, both under Director Eduardo Calmon. Also the name of the general superintendency of the budget, under financial director Vicente Costa e Silva, was changed to general superintendency of control but retained the same functions (budget, accounting, costs and control of assets). According to the same NUCLEBRAS sources, by changing the name of the superintendency, Nogueira Baptista hoped to get a change of superintendent but Vicente Costa e Silva named the same person. The result was that 6 days later, on 3 March, came the new resolution from Nogueira Baptista detaching the control superintendency from the financial directorate and attaching it directly to the presidency.



Those changes in the administrative structure, especially the last one, are causing a revolt in the company, primarily because the reorganization of 3 March was prepared in a few days by the planning superintendent, Colonel Valadao, who calls himself "a selftaught expert in business administration" in NUCLEBRAS.

### Proliferation of Regulations

From the time it was created until now, NUCLEBRAS has not succeeded in establishing an administrative structure. An example of this is the number of resolutions and regulations altering the structure of the company to a greater or lesser degree issued since 1975 (NUCLEBRAS was created at the end of 1974): 17 resolutions and 30 regulations.

In April 1976, the company had four directorates, four general superintendencies (one for each director) and two superintendencies (planning and human resources) attached to the presidency. In December 1977, Resolution 046/77 increased the number of directors to six, reduced the number of superintendencies attached to the presidency to one, and increased to 18 the number of superintendencies attached to the directors, six of them being general superintendencies.

On 2 February 1979 a new organizational change was made: 17 general superintendencies were created. Two weeks later, on 16 February, in addition to other changes, the general superintendencies were reduced to 14.

One year later, on 27 February 1980, the general superintendencies were again reduced to 12 but six other superintendencies were created and attached to them.

Six days later, on 3 March, a new organizational change was made: the general superintendencies remain at 12 but the other six [superintendencies] were eliminated.

All of those changes involved numerous modifications at the lower levels: departments, divisions, and support branches, arousing uncertainty and indecision among the personnel staff of NUCLEBRAS.

### Staff Reduction

Sao Paulo FOLHA DE SAO PAULO in Portuguese 11 Mar 80 p 5

[Text] Rio — NUCLEBRAS yesterday refused to reveal how many employees will be dismissed as a result of the reduction from 13 billion to 9 billion cruzeiros in the investment budget and the "administrative reform" that is being carried out in the company. According to a report published the day before yesterday by a Rio newspaper, 600 middle-level technicians are going to be dismissed by the end of this month but NUCLEBRAS announced only that "there will be a 10 percent cut in the personnel budget" without clarifying how much that budget is. Company sources commented that the "number of those dismissed will not reach 600 by the end of this year."



The same sources said regarding the subject of dismissals, that the official note released by the company on 12 February is still valid: namely, that 'there will not be any mass dismissals in NUCLEBRAS but rather a remanagement' that could affect the whole staff of 2,680 employees of the company and its subsidiaries. Yesterday, the information disseminated by NUCLEBRAS was that the cut would be in the personnel budget and not in the permanent staff. The only dismissal that has occurred since the beginning of the year until now was that of Paulo Dehner, General superintendent of control, according to those same sources.

With regard to the "administrative reform," NUCLEBRAS revealed that since February, 198 assignments of chiefs, deputies and assistants were abolished including 113 positions of chief. About 35 employees were restored to the position of chief. The number of general superintendencies was reduced from 14 to 12, with the general superintendency of Pocos de Caldas and mineral engineering being joined in the superintendency of mining and beneficiation, and the superintendencies of administration and human resources combined into a single superintendency.

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## BRAZIL

### RUMORED NUCLEBRAS DISMISSALS, PROGRAM'S DEACTIVATION DENIED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 13 Feb 80 p 24

[Text] (From our Branch Offices)--NUCLEBRAS' communications staff declared yesterday that the reports according to which about 40 percent of the employees would be dismissed, according to rumors that started circulating at the end of last week due to a cut of 4 billion cruzeiros in the company's budget this year, is unfounded. He also denied the rumor that the company is in financial difficulties which would lead to a deceleration of the nuclear program, as disclosed in Brasilia on Monday, after a meeting between NUCLEBRAS' president, Paulo Nogueira Baptista, and Minister Cesar Cals.

In an official communication, NUCLEBRAS declares that its fiscal funds for 1980 are compatible with the schedule of the industrial projects. However, regarding personnel, while it denies dismissals, it admits that "some readjustments will be necessary in view of these schedules, in order to make the quality and number of personnel compatible with the operational stage of some of these ventures as of 1980," i.e., NUCLEP and the Pocos de Caldas uranium purification plant. Paulo Nogueira Baptista did not receive the press, so it was not possible to learn about the company's program for this year.

However, sources from the nuclear power industry disclosed that a 10 percent cut of personnel is foreseen for the whole year of 1980, this being a sovereign decision of the company, "without any direct connection with the budget."

The same sources confirmed that NUCLEBRAS' initial request from the Secretariat of Planning was of 19 billion cruzeiros, of which only 15 billion was granted. Of this amount, 8.8 billion cruzeiros are destined for new investments, 4 billion to cover previously assumed commitments, and the balance of 2.2 billion for operating expenses.

According to those sources, the budget previously set at 19 billion cruzeiros was based on the initial schedule calling for the installation of the eight power plants by 1990, later decelerated to 1995, according to Minister Cesar Cals.

## Denial

In the Ministry of Mines and Energy, Cesar Cals did not wish to comment on the information that the Brazilian nuclear program might be deactivated due to the reduction of NUCLEBRAS' budget. The minister's immediate advisors only said that the minister would deny the declarations attributed to him. According to them, the denial would be made at the minister's request.

Cesar Cals has not spoken to journalists assigned to the ministry since the publicity scandal disclosed last October, which revealed the scheme of concentrating the entire nuclear sector's publicity budget in the minister's office.

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## BRAZIL

### NUCLEP PROCEEDS WITH PLANT WITHOUT GUARANTEED ORDERS

#### Shortage of Funds

Rio de Janeiro JORNAL DO BRASIL in Portuguese 6 Feb 80 p 19

[Text] NUCLEBRAS will start up its new nuclear equipment plant--NUCLEP--in late March, having no guarantees of any immediate orders so far. The company expects to receive the order for the pressurizer of the Angra 3 plant and for the equipment of the fourth Brazilian nuclear plant--the third one of the agreement with Germany. However, the Angra 3 plant has not even had its site determined, and the fourth plant, which has been the object of serious controversy between the nuclear and hydroelectric industries, has not been decided upon either.

NUCLEP's situation is the consequence of the scarcity of resources affecting the electric power industry which resulted from the delay in the nuclear plant building program. However, in spite of this delay, NUCLEBRAS has maintained the construction schedule of its equipment plant--an investment of about \$290 million--and this is the result: a large factory ready to produce equipment, which no one knows who will purchase or when.

#### Lack of Funds

NUCLEBRAS' main objective, at the moment, is to have the Brazilian Government authorize the contracting of the fourth nuclear plant (equipment partly from Germany and partly from NUCLEP). But the main difficulty, according to experts of the sector, is to determine where the funds for the construction of this plant, and of the following ones foreseen in the agreement with Germany, will come from. According to the same experts, the implementation of the nuclear plant construction programs would absorb over 30 percent of the amount of Electrobras' investments planned for 1995, and, unless funds from other sources are made available, the electric power industry will not be able to proceed with the construction of hydroelectric plants or with the transmission lines programs.

A definition of resources or a change of priorities giving priority to nuclear over hydroelectric plants, would solve NUCLEBRAS' immediate problem

regarding orders for its equipment plant. However, some serious questions would still remain unresolved. The most important one is who to give the responsibility for nuclear plant construction, up to now attributed to Eletrobras, which delegated it, in the case of Angra dos Reis, to its subsidiary, Furnas. For some time, NUCLEBRAS has attempted to obtain this task for its engineering subsidiary, NUCLEN, to which most experts of the electric power industry would not agree, since they cannot see the country profiting from technology transfer if this technology remains restricted to a single company.

CESP [Sao Paulo Electric Co] has landed in the middle of all this discussion. When it became clear that Sao Paulo was the most logical option for the installation of the next nuclear plant, CESP, still during its previous administration, started a geological survey of the Sao Paulo seashore with the purpose of choosing the site, having even contracted the specialized services of the Milder Kaiser company. With the change of administration, the "nuclear program" of CESP came to a virtual standstill, since its new president, Henrique Souza Dias, showed little enthusiasm for nuclear plant construction. Presently CESP itself is split: there is a considerable number of experts within the companies concerned with the fact that during the next 6 or 7 years CESP will have no more hydroelectric projects to realize in Sao Paulo. Thus, it would only have two alternatives left: either to concentrate on operating conventional plants or to get involved in nuclear plant construction. CESP's vice president, Jose Gelasio da Rocha, even without openly declaring himself in favor of the second alternative, makes it clear that from 1990, Sao Paulo, besides not having any new hydroelectric plants to build, will also have already absorbed its share of Itaipu's power, thus becoming a net importer of power produced in other areas of the country.

#### Nuclear Suppliers in Trouble

Rio de Janeiro JORNAL DO BRASIL in Portuguese 14 Feb 80 p 22

[Text] Sao Paulo--Brazilian private companies participating in the Brazilian Nuclear Program find it difficult to obtain orders at this point, and the industry has suffered losses due to investments on which no return has been received. Thus, one company, Bardella, shows a 14-million-cruzeiro loss from investments made to supply transport and handling equipment for the nuclear program without having received a single order so far.

Another company with no orders, but only promises from NUCLEBRAS of supply contracts for heat exchangers is Cobranca, according to its vice president, Marcos Xavier da Silveira. The only one having orders for the nuclear program is Confab Industrial, which is also awaiting a decision by Furnas to deliver the containment vessel of Angra 2. This same company manufactured the containment vessel of Angra 1.



Confab, Cobrasma and Bardella, during the first half of 1977, signed an agreement with NUCLEBRAS, through a letter of intent, for the supply of equipment for Angra 2 and 3, the share of domestic industry being 30 percent if the venture becomes reality.

However, some businessmen declared yesterday that "NUCLEBRAS and NUCLEN, where budget cuts have been made, have no resources. This has decapitalized the Brazilian Nuclear Program, which also has a large manufacturing plant paralyzed though completely equipped, as is the case of NUCLEP."

Capital equipment manufacturers are awaiting the new construction schedules of Angra 2, which is already 2 years late, according to calculations of Sao Paulo businessmen connected to the equipment supply industry.

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**ANGRA 2 DELAY COSTING \$240,000 IN INTEREST**

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 15 Feb 80 p 24

[Text] (From our Rio office)--The accumulated delay in the construction of the Angra 2 nuclear power plant is 2 years, which means that the additional financial cost, that is, interest, is \$240,000, disclosed Licinio Seabra, president of Furnas Power Plants yesterday. The delay is reflected in the next plant, Angra 3, which will not start operation until 1988.

The initial construction schedule called for the operation of Angra 2 in 1983-84, with the construction of the head slab starting in March 1979. However, due to problems with the foundations which have plagued the construction for over a year, the construction of the slab will not start until April 1981 since the job of strengthening the footings is time consuming, said Linicio Seabra.

Currently, the National Nuclear Power Commission is still studying the new footing-strengthening project, and Furnas will not receive permission to continue construction, whose details are still missing, until March. Strengthening means placing about 80 floating footings, in addition to reenforcing existing ones. This work means an additional cost of \$50,000 to \$100,000 according to Furnas' president.

Who is to pay for the new project of Angra 2's foundations, designed by NUCLEN and KWU, is still being discussed. Linicio Seabra said that no error had been found in the previous project which would place financial responsibility on the designers. Thus, Furnas, which is only an executor of the project, may have to pay for the new design too.

The Angra dos Reis Power Plant has already absorbed \$1.5 billion, of which \$1.2 billion were consumed by Angra 1 and the balance by the two subsequent plants. Angra 2 has only the foundations laid down and Angra 3 will not have its site determined until March or April. According to Seabra, the estimated cost of a kilowatt installed at Angra 2 and 3 after the maxi-devaluation of the cruzeiro, is \$2,600, against \$2,000 at Angra 1.

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## BRAZIL

### CIVIC PROTEST RISES AGAINST SAO PAULO PLANT CONSTRUCTION

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 14 Feb 80 p 62

[Report by Carlos Ialongo and Edson Martinez, with final text by Maria das Dores Basile of the Santos Office]

[Text] The reaction against the possible construction of nuclear plants 4 and 5 on Parnapua Beach, in Peruibe and on Cardoso Island, in Cananea is growing all over the Sao Paulo coast, and it could trigger a strong campaign--of national character--against the installation of this type of plant in Brazil. The first organized demonstration called "The March of Life" will take place within 30 days on the streets of Sao Paulo city.

The decision was made yesterday by the Commission for the Defense of Public Property and the Sao Paulo Association for the Protection of Nature during a meeting held at the Sao Paulo University. According to Dr Joao Antonio Saez Cervantes, resident of Peruibe, the demonstration is "to show the authorities the people's repulsion of this sophisticated way of producing energy." The physician said it would be a gigantic manifestation to demand a clear definition from the Sao Paulo government on whether it accepts such plants on the coast. "We want the governor to break his silence, and we want to guarantee a leisure area for the 11 million people of Sao Paulo city," he added.

The first warning of the government's intention to install plant No 4 in Peruibe was given by Ernesto Zwarg, president of the Society for Ecology, Landscaping and Humanism, of Itanhaem: "I saw the blueprints at the office of Kurt Engenharia, one of the bidders for the project. The details were complete and they showed, on the Island of Boquete, 70 meters from the beach, the construction of a pier about 400 meters long," said Zwarg.

Zwarg also noted the projects and survey being carried out on the beach by CESP specialists. Specialists went to Peruibe between last December and January and told the members of the five families living on the beach that the government indeed intended to build a plant in that area.

One of the concerns of the president of the Society for Ecology in Itanhaem is that the plant would make it necessary to isolate an area of 2 square kilometers for its construction and another 200 square kilometers considered an area affected by nuclear radiation. "Parnapua is quite close to the center of Peruibe, less than 35 kilometers. An accident at the plant would put all residents and tourists of the resort in immediate danger," warns Zwarg.

### In the Valley

Jose Rubens Fortes, president of the Society for the Defense of the Environment, sent a telegram to Cesar Cals, minister of mines and energy; to Paulo Nogueira Baptista, president of NUCLEBRAS, and to Governor Paulo Maluf, expressing opposition to the construction of plants on the southern coast and in the Ribeira Valley. At the same time, he promised to initiate a campaign to raise the population's awareness of the inconveniences and perils of nuclear facilities.

Fortes says he cannot understand how branches of the same government can act in such disaccord: "While SEMA [Special Secretariat for the Environment] is preparing to install an environmental center in Jureia, NUCLEBRAS wants to build a nuclear plant a few kilometers from the point." He guarantees that the society he heads will do everything so that "the coming generations do not inherit a Trojan horse."

Like Ernesto Zwarg, Fortes points out the dangers of the winds which can carry radioactive residues large distances. Zwarg mentions the southern winds prevalent on the coast which can carry contaminants, in case of an accident at the plant, to the whole Greater Sao Paulo area (including the capital), in less than 15 minutes. And the eastern wind which constantly blows from the sea landwards, presents the same danger to the populations of this and other areas, according to Fortes.

At the Iguape prefecture, the only one so far that has taken a stand against the nuclear projects, advisor Onesio Franco says that the council has also sent a cable to Minister Cesar Cals and to the governor requesting a halt to the program. According to Franco, the Iguape touristic projects will inevitably be hurt by the plants, and the Una district's urban development plan, recently approved, will have to be cancelled.

In Cananea, City Councilman Jose Alberto Mazza, who denounced the construction of nuclear plant 5 on the Island of Cardoso, understands that the Ribeira Valley is not suitable for such a project. According to him, the technology to be used at these plants has been rejected by other countries, such as the Netherlands.

Like Mazza, Father Joao Van Der Heiden, the local priest, considers it urgent to raise the population's awareness of the risks nuclear plants may represent, pointing out that the technology being transferred by the Germans to Brazil has not been tested even in Germany.

#### In Peruibe

Protests against the construction of a nuclear plant on the southern coast started in Peruibe last week, when second grade students proceeded to cover the city's walls with slogans like "Beans yes, plant no" and "Peruibe, city of death."

The movement gained momentum on the 10th, when 2,000 people participated in a demonstration at the same time as the municipality started commemorating the anniversary of its political emancipation. The municipal authorities gave no support to the act, and Mayor Gheorge Popescu declared officially that he knew nothing about the intentions of the federal government, saying he would request the government of the state to confirm or deny that Peruibe would be the site of the fourth Brazilian nuclear plant.

However, the legislative branch has already joined the protest. Wilma Carmen Gastan, councilwoman and president of the Municipal Council, has sent letters to authorities and entities worried about the dangers of a nuclear plant, saying that the use of nuclear energy ~~is~~ unnecessary when the hydraulic resources of the area are still unexplored; that the plant should not be built on the only national forest park of the state and that the project is dangerous, since no country having adopted it so far can guarantee its safety.

Former councilman Armando Prado, who represents the conservative sector in Peruibe, understands that the plant would bring economic benefits to the city, an idea shared by Silvio Niskier, professor of the University of Sao Paulo, for whom "it is necessary to open new paths and, with the technical people who will come to the city there will be an evolution in the population's habits and its way of thinking."

For Albertine de Almeida Batista, president of the Civil Defense Commission of Itanhaem, the question is more simple: "The plant is only a question of 'status' for Brazil and for the other countries. We must say that we are already developed."

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# ENRICHED URANIUM CONTRACT TO BE RENEGOTIATED

Rio de Janeiro JORNAL DO BRASIL in Portuguese 11 Mar 80 p 2

[Text] The Brazilian Nuclear Corporation (NUCLEBRAS) will have to renegotiate the contract for supplying enriched uranium it signed with the Anglo-German-Dutch URENCO consortium. If it does not, it will end up with a large quantity of uranium in storage and not being used for a time inasmuch as the construction of nuclear plants is completely delayed. The formation of those stocks would mean tying up about 150 million marks in enrichment services alone for the period 1983-1985, not counting the costs and risks of storing the material.

That conclusion comes from an internal report of NUCLEBRAS signed by Jose Carlos Castro, technical adviser to director Ney Freire and responsible for the contract with URENCO. The document, dated 15 September 1979, says also that if the contract is maintained on current terms, in addition to the problem of what to do with the surplus enriched uranium, NUCLEBRAS will not be in a position to supply all the uranium to be enriched by URENCO from only the production capacity of the Pocos de Caldas mine, the first Brazilian mine.

## "Inflexible Contract"

The NUCLEBRAS internal document states that the basic difficulty of the contract with URENCO is its "lack of flexibility to accommodate delays in the implementation of the Brazilian nuclear program." The contract is divided into two parts, one called firm and the other optional. The firm part provides for supplying 1,986,000 UTS (enriched uranium units), with deliveries during the period 1981-1990. The optional part provides for supplying 1,842,000 UTS, with deliveries during the period 1983-1990. NUCLEBRAS has already paid URENCO a downpayment in the amount of 35 million marks for the orders based on the firm part of the contract and, since it decided to exercise the option pertaining to the other part, it has to pay another 35 million marks this month.

When those quantities of enriched uranium were contracted, the entrance into commercial operation of the Angra-1 plant was scheduled for November 1979, that of Angra-2 for May 1984, and that of Angra-3 for November 1985. With

the delays in the projects, however, Angra-1 will not go into operation until 1980, Angra-2 in 1987 and Angra-3 in 1988. Those delays have caused the real demand for uranium conversion and enrichment services to be much less than the quantities contracted with URENCO. The report, thus, asks that NUCLEBRAS establish guidelines, defining if it is going to initiate a policy of forming stocks, assuming the costs involved, or if it going to try to change the optional part of the contract to better adapt it to demand.

The document shows that if it opts for the maintenance of stocks, NUCLEBRAS will have difficulty in defining an enrichment that can later be adapted to different plants. In addition, it will have to define how to store the material in an appropriate place with radiological control and to assume the high costs of storage and the financial charges of the tied-up capital.

According to the report, the 1,986,000 UTS of the firm part of the contract with URENCO takes care of all the demand for enrichment services of the Angra-1,-2,-3 power plants, with only a deficit of one recharge in 1980, which can be covered by the Brazilian enrichment plant scheduled to go into operation in 1984. Even counting nuclear plant No 4, about the construction of which no decision has yet been taken thus far, the initial demand for enriched uranium for that plant will not occur until 1986 and "can be taken care of by the firm part of the contract in view of the low demand in 1984 and 1985."

Concluding that it is necessary to renegotiate the optional part of the contract, the document shows that "there is no envisaged destination for the enrichment services stemming from the optional part in 1983, 1984 and 1985." Even if NUCLEBRAS withdraws only the minimum amounts provided for in the contract, in those 3 years, there will be an annual stock of enriched uranium of about 500,000 UTS, "which is equivalent to tying up about 150 million marks in enrichment services alone."

#### The Problems With the Raw Material

In addition to recommending renegotiation of the quantities of enriched uranium, the report shows that it will be also be necessary to renegotiate the supplying of uranium (uranium hexafluoride) conversion services--the stage prior to enrichment. The reason for that is that the Pocos de Caldas plant "is not in a position to supply the U-308 (yellow-cake) to fulfill the commitments assumed."

According to the document, NUCLEBRAS is not even in a position to deliver to URENCO the 110 tons of uranium hexafluoride it borrowed for a period of 6 months and will have to return in December 1980. In order to do so, the Pocos de Caldas would have to supply the yellow-cake in April 1980. In the meantime, the beginning of experimental operation of the plant is not scheduled until July of that year and commercial operation in December.

The report also asks that in the renegotiation, NUCLEBRAS try to obtain from URENCO "more favorable operational conditions, especially with regard to

definition of the enrichment." The document states that the contract with URENCO "requires decisions 4 and even 6 years in advance, which is not practicable at the current stage of the Brazilian nuclear program inasmuch as the variables necessary for the taking of a decision are not known that far in advance."

The contract, for example, provides that the optional part can be rescinded partially or completely in the event that there is national production in equivalent quantities. But in order to do so, NUCLEBRAS has to advise URENCO 6 years in advance. If the rescission is made in a shorter period, it [NUCLEBRAS] will have to pay a fine that can vary from 5 to 70 percent of the value of the services canceled. "Since the national production of enriched uranium is going to begin in 1984, it is necessary to conduct studies with a view to planning the rescission in order to prevent a surplus of enrichment services," the report says.

The document points out a failing in NUCLEBRAS' procedure. The company "defined the enrichment of the first and second recharges of Angra-1 without even obtaining the preliminary energy requirements from Furnas. Having in view the implications for operation of the nuclear power plants, it is essential to discuss energy requirements with Furnas before defining future enrichment, especially for the recharges."

#### The Commitments Assumed

In addition to having already paid 35 million marks as a downpayment on the firm part of the contract and having paid another 35 million this month for the optional part, NUCLEBRAS has already contracted financing for the first 5 years of supply in the amount of \$200 million. It has already set the monthly deliveries of enriched uranium and uranium hexafluoride for the period 1981-1983 and defined the levels of enrichment, the quantities and the waste content. It has also decided to bring to Brazil all of the waste associated with the first delivery of enriched uranium.

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## BRAZIL

### BRIEFS

**CEARA URANIUM EXPLOITATION -- Joao Pessoa --** Beginning next week, the federal government, through the Brazilian Nuclear Corporation (NUCLEBRAS) and a German company, will resume the exploitation of uranium in the municipality of Sao Jose de Espinharas in the Paraiba backwoods, from which 10,000 tons of the ore had already been exported to West Germany up to 1979. That, at least, is what Federal Deputy Octacilio Queiroz (Brazilian Democratic Movement Party), who was photographed holding uranium samples, told the newspaper O NORTE. The work of drilling the ground and exploiting the ore had stopped some months ago because, according to the deputy, the Ministry of Mines and Energy had decided to concentrate its exploitation in the Ceara municipality of Itatiaia, which accounts for most of the production of uranium in the country. But now, he reported, the work will be resumed more intensively in Sao Jose, which already has installations and technician-machinists, necessary to drill and store the Paraiba uranium of greenish color, to the point of impressing Brazilian and German technicians. [Rio de Janeiro O GLOBO in Portuguese 24 Feb 80 p 28]

**ECOLOGIST'S COMMENT ON BOMB --** Otto Buchsbaum, president of the Brazilian Ecological Resistance movement said in Helsinki yesterday that Brazil may have its own atomic bomb within a few years thanks to the nuclear agreement signed with West Germany. Buchsbaum, who is in Finland at the invitation of an antinuclear association, said that work on the construction of a uranium enrichment plant in the city of Resende has been considerably accelerated and that will enable Brazil to have its own atomic bomb within the next few years. [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 26 Feb 80 p 6] 8711

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BRIEFS

**RECORD URANIUM PRODUCTION—Windhoek:** A world record was shattered in the Namib recently, according to the latest edition of Rössing Uranium News. Rössing product recovering section had the highest production of uranium ever for a 24-hour period which exceeded the previous world record, also held by Rössing. Although the figures may not be published, Mr Chris Sylvester, assistant superintendent in recovery, said that it was never before possible to produce such an amount of uranium. "It is only by close attention to filtering and roaster temperature control that the through-put and the grade have been increased simultaneously," he said. [Text]  
[Windhoek WINDHOEK OBSERVER in English 1 Mar 80 p 21]

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## BRIEFS

**NONNUCLEAR COUNTRIES' GUARANTEE SOUGHT**--Finland demands security guarantees for nonnuclear countries in the event of a nuclear attack or the threat of the use of nuclear weapons. Finnish representatives have handed to the UN Disarmament Committee, meeting in Geneva, a document in which Finland's views on the nuclear proliferation ban are explained. According to the document, the minimum goal must be the most binding possible guarantees that there will be no attack against nonnuclear countries and that they will not be threatened with nuclear weapons. The territory of airspace of nonnuclear countries must not be violated in the launching of such weapons at their targets, the Finnish statement says. In Finland's view the Nuclear Nonproliferation Treaty and the nuclear-free zones together with guarantees form an entity. At its Geneva session the UN Disarmament Committee will aim at an arrangement in which all nuclear weapon states bind themselves not to use nuclear weapons against countries which do not possess such weapons. [Text] [LD191710 Helsinki Domestic Service in Finnish 1530 GMT 19 Mar 80 LD]

**TVO-2 SHUT DOWN**--Test operation of the second Swedish nuclear reactor in Finland was stopped on Monday, 25 February 1980. The reason is a defect in the electric generator. Its rotor has to be sent back to Sweden for inspection and possible repair. As a result, the beginning of commercial operation will probably be postponed until next fall. It is Asea-Atom which delivered the TVO-2 (and also the TVO-1, which was put into commercial operation a week ago). The generators are produced by Asea, which is one of Asea-Atom's subcontractors. Asea has been having problems with its water-cooled rotors for a long time. People were forced to carry out extensive repairs in nuclear powerplants in Sweden, too. At Asea, they suspect that this time what is involved is material failure. No leakage of water occurred, as was the case in Sweden. [Text] [Stockholm DAGENS NYHETER in Swedish 26 Feb 80 p 7] 9266

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**FOREIGN POLICY INITIATIVES IN NUCLEAR PROLIFERATION**

Paris PROJET in French Jan 80 pp 40-55

[Excerpt from article by F. Beauchataud, G. Florent, J. Pelletier:  
"Several Horizontal Policies"]

[Excerpt] Non-Proliferation Nuclear Policy

The French position is difficult to define. An understanding of the lines along which the French intend to lead the campaign against nuclear proliferation should take into account their concern for independence and their position of nuclear military power, their prospects for exporting nuclear technology, their desire to contribute to the development of the Third World countries requesting their support, and, finally, their energy weakness, a situation shared with numerous other countries.

No doubt, L. de Guiringaud, who arrived at Quai d'Orsay in late August 1976, and who had become familiar with nuclear problems during his stay in the United States (Permanent ambassador to the United Nations), greatly contributed to the translation of the non-proliferation desires of the president into reality and facilitated the elaboration of the French doctrine in the face of these various considerations.

The distance between the various partner's positions is such that creation of a new international nuclear order is illusive, at least in the near future. It is better to define a position of reconciling, insofar as it is possible, an effective limitation of the risks of proliferation with the interests of the countries. Looking back, this policy has assumed four aspects.

From the institutional point of view, the desire to lead a more active campaign against proliferation was shown by creation of the Foreign Nuclear Policy Committee [CPNE] under the president, joining the major involved ministers, the CEA general administrator delegate and several people influential in the areas under discussion. The CPNE has its work prepared by a group of experts presided by a high-placed person in the ministry of foreign affairs. Henceforth, French non-proliferation policy has been elaborated at the heart of this institution which meets three or four a

year and whose meetings are not systematically followed by official statements. Its creation reduced the work of the Examining Committee for exports of sensitive material, which now deals with precise government directives.

The first meetings of the CPNE, during the autumn and winter of 1976, were dedicated to elaboration of the doctrine. This is basically expressed in the statement of 11 October 1976, which sets forth six main principles:

- the need to develop nuclear energy and the French desire to contribute to the implementation of its peaceful uses;
- the French desire to retain control of its nuclear exports policy;
- the concern to back up the guarantees surrounding French exports ("France does not encourage proliferation of nuclear arms");
- the desire to insure the security of the supplies for the power plants exported by French industry and to insure any requested fuel cycle services;
- the need to avoid commercial agreements favoring proliferation;
- the offer to consult with all interested countries, whether or not suppliers of technology.

To these orientations should be added the decision "to no longer authorize, until otherwise directed, the signing of bilateral contracts pertaining to the sale of industrial reprocessing plants to Third World countries," made public after the CPNE meeting of 16 December 1976. This formula demonstrates recognition of the specific risks of the plutonium cycle but without condemning as such the process of retreatment and supply but without condemning as such the process of retreatment and supply of breeder reactors and without taking an irreversible stand for the future.

On the whole, affirmation of these positions does not, of course, resolve all the outstanding problems. Nevertheless, they have the merit of a certain clarity, and they are posted publicly, facilitating dialogue with buyers as well as with the other suppliers. Above all, they are immediately applicable, an appreciable advantage compared to the inevitably longer international agreement. Finally, from the tactical point of view, independent definition of these positions in late 1976 allowed France to more easily approach the negotiations foretold for 1977 by the election of Carter to the White House.

The third axis of French policy is research for less proliferating technology, which would facilitate considerably the development of peaceful uses without totally removing the ambivalence associated with nuclear energy. The significance of the national effort, perfected since the 1950's, and the resolutely nonproliferant orientations taken by the President since 1976 have served to accelerate the work. The most spectacular progress is in the field of enrichment. In Salzburg, in May 1977, Mr Giraud, then CEA administrator delegate, announced the perfection of a chemical enrichment

process, perfectly unable for enrichment to 3.5 percent of the uranium destined for light-water power plants, but which in practice, taking into account its characteristics, could hardly be used to reach the 90 percent rate necessary for military utilization. This process has aroused a lively interest; a collaboration with Germany and the U.S. is in progress, and construction of a pilot plant is envisioned. In the particularly sensitive area of reprocessing, the CEA has considered various formulas called "co-processing" which could permit recovery of the fissionable fuel contained in the irradiated cores without isolating the plutonium. Along the same lines, "tunnel-plants" for reprocessing would limit the possibilities of diverting plutonium being processed and would be easier to manage and control in a multi-national framework. Finally, fabrication of uranium elements enriched to 20 percent--called "caramel"--usable in research reactors and substituting for the highly enriched uranium used up to now will permit progressive restraint of this form of proliferation.

French mastery of all the stages of the fuel cycle and these technological advances give us a special role in the "International program for fuel evaluation" [INFCE], launched in autumn 1977. One might hesitate to cite these works as an element of French policy, but it is on the personal insistence of President Cartier, who made it one of the elements of his April 1977 declarations, that the chiefs of state in the industrialized countries adopted the principle of this exercise at their summit meeting in London in May 1977. However, France played an active role at the beginning to see that this "Program" deals with the scientific aspects of nuclear technologies (preparatory meetings, in Paris, summer 1977) and avoids the political aspects of non-proliferation, debates which would be purely polemic due to the lack of preliminary objective illumination. These works are currently being completed. Thus outlined, the French proliferation policy is bound to encounter obstacles. Certain ones were mentioned in passing, but it is useful to take up some of the most significant or most recent problems.

Figuring among these difficulties is the contract to sell a pilot reprocessing plant to Pakistan. After having been the object of negotiations for several years and having been formally approved by the AIEA [expansion unknown], the sale was vigorously attacked by the American secretary of state in the summer of 1976. At that time, there was no reason to give up a contract just approved by the Vienne Agency. Following political upheavals and financial difficulties, things changed when Pakistan had to forego rapid completion of its ambitious nuclear power plant program--then the construction of one reprocessing unit seemed a lot less urgent. Such were the conditions when France proposed to turn this delay to good use and study the application of one of the co-processing formulas which was being perfected. This proposal has the advantage of sheltering supplier and client from the reproach of nuclear proliferation. The matter is still open.

Reprocessing brings up a second difficult--presently there is no recognized international rule for restitution and storage of the plutonium extracted from irradiated fuels. Thus the French Government is striving to



reconcile its own non-proliferation principles with non-discriminatory treatment of the various clients (Germany, Japan, etc) of the plant in the Hague.

Industrial cooperation with other industrialized countries, namely Germany (breeder reactors), poses problems insofar as some of our partners do not share all our concerns in the area of proliferation.

With the developing countries, experience stumbles over the ambiguity of any nuclear collaboration. It is normal to educate engineers and technicians in the countries which will ultimately have recourse to electricity of nuclear origin. Definition of the training, education and especially the equipment placed at their disposal raises inevitable problems of application. These questions in particular will be brought forth at the TNP revision conference in 1980.

Finally, elaboration and polishing of the non-proliferation policy should be combined with our membership in Euratom [European Atomic Energy Commission], a treaty worked out in an entirely different context. France has recently formulated revision proposals for chapter VI of this treaty (supply of fissionable material). These proposals tend to resolve several of these problems.

These examples demonstrate the difficulty of formulating and applying a "horizontal" policy tangled in its technological, economic, military and diplomatic aspects. Disarmament offers an analogous illustration of this.

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LABOR UNIONS DIVIDED ON NUCLEAR POWER PLANTS

Milan IL GIORNALE NUOVO in Italian 3 Mar 80 p 6

[Article by Filippo Pepe: "Nuclear Power Divides the Unions"]

[Text] While the CGIL [Italian General Confederation of Labor] and the CISL [Italian Confederation of Labor Unions] seem to favor it, the UIL [Italian Union of Labor] is clearly opposed. According to Massimo Bordini, head of CGIL energy policy, agreement on installations is subordinate to emergency and security plans. For the UIL's Giampiero Sambucini it is indispensable to draw up a unified energy plan. How to keep the people properly informed and make painless choices.

Rome, 2 March--The unions are still concerned with the problem of nuclear power plants, and they have so far not been able to find a common policy on which they can agree. While we have on one hand the CISL and CGIL in favor of building the plants, albeit with some reservations, we find on the other hand the UIL, which is opposed to going the nuclear route and proposes instead the reactivation of hydroelectric plants and greater use of alternative forms of energy sources.

The CGIL, CISL, and UIL are therefore divided on the problem of nuclear power, and at the moment it is hard to find agreement on an issue that is becoming more pressing every day.

Is it true, we asked Massimo Bordini, head of CGIL energy policy, that his union seems to be the most favorable to nuclear plants?

"The degree of mastery of nuclear technology," Bordini answered, "on the part of Italian business, ENEL [National Electric Power Agency], and the CNEN [National Nuclear Energy Commission] is inversely proportional to the attractiveness of the idea of nuclear power in itself. The CGIL is aware of this and opposes not only building any further new plants but also fully using the largest plant already built, the Caorso plant, unless answers are forthcoming to basic questions being asked by the union and local government agencies

concerning management and emergency and security plans in general. We don't take a position that considers the mineral uranium as being all bad and that condemns studies of possible ways to use it. Rather we have stressed the necessity for making the greatest possible effort to learn about and control it, an effort that involves the participation of workers and the people. Among the positive steps that the CGIL has taken recently is the establishment of a union commission on energy source security, beginning with the Caorso problems.

"We hope," Bordini continues, "that the initiative will become a unified one large enough to support an active group of technical specialists and staff, which are now rather dispersed. We need to succeed in putting into practice the diffusion of knowledge and the activism of workers who cannot stand alone in the world of public relations or hide under the bed of reactionary delusions. This kind of task means, if it is to be achieved, that we not be subordinated to the ENEL program's deadlines, and that we not give up politics dealing with the present industrial reality with all its problems."

But won't this "non-refusal" of nuclear power cause problems with the membership, who might reproach you for having "tied" Italy to uranium-producing countries like the United States?

"In producing electricity, the power plants account for only 25 percent of all imported energy, and only 57 percent of the plants use petroleum derivatives," Bordini answered, "thus even under the absurd hypothesis that all electrical energy produced by oil today would be produced by nuclear power, we would be dependent on uranium suppliers for only 14.25 percent of all our energy needs. The problem of dependency actually concerns the 'gap' in technology, research organization, and management of energy sources, and these are problems linked with the issue of security, which has so far not been sufficiently addressed."

The UIL, as we said, has been the most critical of the confederations on the subject of nuclear power plants. Some confusion appeared several times after the Venice conference; can it be considered overcome? We asked this of Giam-piero Sambucini, confederal secretary of the UIL.

"The Venice conference had the merit of shedding light on an issue that has too often aroused emotional arguments rather than political and scientific discussion. I think," Sambucini said, "the very confusion that the UIL has often shown played a part in holding the conference in the first place. It was the UIL, in fact, that insisted on the conference as a place for authoritative debate on issues that would have otherwise remained the prisoners of opposing ideologies. And that would have led to a sterile and inappropriate solution.

"Therefore I think it was a positive action," Sambucini adds, "that the Venice conference emphasized the necessity for establishing a coherent energy plan that provides for and harmonizes the development of all available energy sources, even nuclear power. It is also a positive development, however, that we have

all recognized the necessity of guaranteeing adequate security measures for nuclear power sources, for the sake of both the workers and the people. I also think it is very important that such measures be connected with punctual and accurate information to the public. In this matter I definitely think we must be realistic and not yield to the temptation to seek a consensus 'wherever it may be hiding,' even at the cost of yielding to emotionalism. A realistic and programmed energy policy is indeed essential in order to assure the country sufficient economic and social development in the near and middle future."

May safety problems be considered solved? They are the battle cry of the antinuclear forces.

"It was shown in Venice that safety standards match those of other countries using nuclear power. If they are absolutely adequate," the UIL secretary answered, "well, that remains to be seen, but I think we need not set ourselves the problem of achieving absolute certainty; rather we should try to adopt a dynamic criterion of safety, a criterion that would be brought up to date as problems arise and knowledge advances. Indeed, I would be very worried if the quest for optimum performance finally lapsed into obtuse immobilism based on the philosophy of 'no solution' to the problems, which are obviously as urgent as they are difficult."

What does the union want to do now?

"I think it is ultimately indispensable to go the route of energy-source diversification and conservation, which offer more substantial solutions in the short term; and we should have a rational civilian and industrial use of energy, and develop 'clean' technology and renewable energy sources.

"The union certainly cannot take 'radical chic' positions, nor can it delude itself that the choices we have to make to overcome the energy crisis can be painless or leave things as they are in industry or in the lifestyles of workers and citizens."

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**RADIATION SAFETY INSTITUTE ISSUES REPORT ON MELT-DOWN DANGERS**

Stockholm SVENSKA DAGBLADET in Swedish 22 Feb 80 p 12

[Article by Bo Ostlund: "The Weather Determines Which Cities Are Hit"]

[Text] "It is 0730 hours on Tuesday morning. It is foggy over Oresund. People are on their way to work and car radios are giving the news. However, what has been dominating news broadcasts on the mass media for a long time, not only in Sweden but all over the world, is soon heard:

a melt down is occurring in Barseback and thousands of people will die during the next few days."

Today, which is Friday, the SSI (Institute for Protection against Radiation) is presenting Volume 5 of its report entitled "More Effective Preparedness."

In the introduction, experts try, for the first time, to make clear, approximately as is done above, the series of tables, curves and figures which are used to analyze the connection between all the mechanisms which determine how a nuclear power accident develops and what its consequences will be.

The probability of serious consequences is weighed against the size of the accident and the fact that the scope of the accident is mitigated or aggravated by different types of weather, etc. The imaginary scenario, which describes the events which take place, hour by hour, leads to certain conclusions.

Melt-downs of varying degrees of seriousness are the consequences connected with big accidents which are described:

They are melt-downs with or without fracturing of the reactor tank, with or without fracturing in the internal connections, and with or without an explosion of steam which, in the worst of all possible cases, throws parts of the hearth out, far from the reactor building.



## Fatal Puff of Gas

The fact that there are many other courses which can be taken by an accident which are considerably more probably than a melt-down, but which have significantly less serious consequences, is also stressed.

Then, in this scenario, the way the fatal puff of gas emerges from the reactor, owing to the heat of the hearth--doing so most frequently through the smokestack (that is, if the reactor building is undamaged)--and how the plume is then diffused--is described.

In the case of Barseback, for example, weather conditions, all of which are entirely conceivable and some of which are quite usual at certain times of the year, exist which will spare Malmo and Copenhagen completely even if the wind is blowing in that direction. Instead, it will be the continent of Europe or England which will suffer. (In the same way, Sweden can suffer ill effects from West German or Eastern European reactor breakdowns).

Then they also describe the consequences for areas which are contaminated by material which comes into contact with the ground--which happens with milk, for example.

The various types of accident which are described determine the consequences. For example, how large an amount of heat is there in the outlet? That determines how high the plume can rise during the first phase.

The meteorological patterns are extremely changeable. Some patterns are purely theoretical: an ice-cold winter night with high atmospheric pressure over Barseback and heavy precipitation over Copenhagen, for instance.

Radiation dosages depending upon the type of accident, the time and the distance away determine the consequences.

Some of the SSI's conclusions are as follows:

A melt-down of a serious type, with fractured internal connections, is required to cause acute, highly dangerous injury to the population living farther away than 20 kilometers. The cases of cancer which are caused by an accident during dry weather occur at a great distance away. (For example, the continent of Europe is hit by what happens in Barseback).

The most usual ailments in the case of big accidents are serious lung inflammations.

The areas which are so contaminated that big problems arise for those who reside there will be of a size of up to 2,000 sq km in the case of big accidents.

In the case of the biggest accidents, areas of up to 40 sq km would have to be abandoned for decades. The economic consequences, it is believed, would be extensive, even if interruptions to activities were insignificant.



ECONOMIC DIFFICULTIES PROBABLY MEAN SWEDISH N-PLANT CANCELLATION

Stockholm DAGENS NYHETER in Swedish 26 Feb 80 p 7

[Article by "TT": "No Swedish Nuclear Power to Turkey"]

[Text] Storuman--There probably will not be any selling of Swedish nuclear-power technology to Turkey. Turkey's economic difficulties are too substantial and the Swedish government is not prepared to come up with bigger export guarantees than those which have already been offered, Minister of Commerce Staffan Burenstam-Linder (Moderate Coalition Party) said in Malmo on Monday.

"If the answer to nuclear power is 'no' in the plebiscite a month hence, no country will be interested in buying nuclear power technology from Sweden any longer. But even if the answer is 'yes' in the plebiscite, it is extremely improbable that Asea-Atom's deal with Turkey will come to anything," the minister of commerce said.

The Answer Will be "No"

In connection with the visit to Sweden by the present prime minister, Bulent Ecevit, in December 1978, the Liberal Party government promised governmental guarantees for long-term export credits if Sweden got the job of building Turkey's first nuclear power installation. At that time, Ecevit declared that Sweden was in the best position among the countries which wanted to sell nuclear-power technology to Turkey.

Since then, Turkey's economy has deteriorated. For that reason, the Turkish negotiators have asked for additional credits to carry out the purchase. But the Swedish government is going to say "no," Burenstam-Linder says.

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END

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